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Online and Face-to-Face Classes: A Comparative Analysis of Teaching Presence and Instructor Satisfaction

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ONLINE AND FACE-TO-FACE CLASSES: A COMPARATIVE ANALYSIS OF TEACHING PRESENCE AND INSTRUCTOR SATISFACTION

by

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ONLINE AND FACE-TO-FACE CLASSES: A COMPARATIVE ANALYSIS OF TEACHING PRESENCE AND INSTRUCTOR SATISFACTION

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Teaching presence is one of three components of the Community of Inquiry Model proposed by Garrison, Anderson, and Archer (2000). This study examined teaching presence, as measured by the instructional design and organization, and directed facilitation (Shea, Li, Swan, and Pickett, 2005), in a large undergraduate science course, contrasting two modes of lecture delivery, face-to-face and online video. Confirmatory factor analysis validated the teaching presence instrument, producing factor loadings similar to Shea et al.'s for both online and face-to-face delivery. Analysis of the relationship between instructor satisfaction and teaching presence (instructional design and organization, and directed facilitation) produced a significant ($p < 0.05$) but relatively weak ($r = .50$) correlation. Differences between mean instructor satisfaction and teaching presence scores showed no significant differences based on the mode of lecture delivery.

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CHAPTER I

Introduction

Online Learning: Recent Events

In recent years, online learning has become increasingly popular across the higher education spectrum (Dunn, 2000). Due to ease of delivery, to attain new students and lower delivery costs, institutions have turned to distance education programs as cost effective growth centers. For learners, convenience of learning online has replaced many of the traditional educational environments and has given them more and greater opportunities to continue their education. Enrollment numbers support this trend as well. According to the Sloan-Consortium report, Sizing the Opportunity: The Quality and Extent of Online Education in the United States (Allen & Seaman, 2007), figures compiled showed by Fall 2004 an estimated 3.5 million students were projected to be enrolled in the nation's institutes of higher education online distance education courses. The authors also found that more than 33 percent of the estimated 1.9 million students enrolled in distance education classes in 2003, took all of their courses online, and more than 80 percent of U.S. colleges offered at least one fully online or blended course (Allen & Seaman, 2004). Others have found similar growth in the U.S. and Canada (Lewis, Levin, & Greene, 1999; Parasad & Lewis, 2008; LaGrange & Foulkes, 2004).

For students choosing to participate in online learning environments, the flexibility of "anytime, anywhere" accessibility has many advantages. Students can access their course content nearly 24 hours a day, giving them greater convenience and flexibility in their daily lives to participate in furthering their education. The very nature

of the environment may give students not only time to be thoughtful in their reflections but to have at times a greater timeframe in which to reflect and to think about the materials presented.

Online Learning: Criticisms

Even with these inherent advantages, online learning is not without disadvantages. Critics contend that learning online lacks many of the advantages of face-to-face learning. In particular online learning environments have come under scrutiny as not delivering equal or comparable educational experiences for learners. The core of this argument is the notion that the instructor is removed by distance and time and that students have a perceived sense of loss in terms of a vital contextual component of the learning community. Bullen (1998) found that some students felt detached from other students or isolated while learning online. Further, students often felt as if the delay in online communications reduced the dynamics of online discussions.

A Sense of Togetherness

A key component to learning is the transactional exchange that exists between the teacher and the student. Without this exchange and access, learning is either greatly hindered or arguably nonexistent. This collaboration has also been known as teaching immediacy. Early research examining teacher immediacy by Mehrabian (1967, 1969) suggested that increased nonverbal behaviors helped reduce the physical or psychological distance between teachers and students. A tapestry of subsequent research has emerged. Andersen (1979) suggests that both verbal and non-verbal communication styles affect perceived "closeness." This closeness or reduction in perceived distance between people,

whether it is physical or psychological, has a direct orientation impact on communicator / receiver or teacher/student relationship. Anderson, Norton, and Nussbaum (1981) research, found that those teachers perceived by students as having a positive communication style were also perceived generally more positively. Students will often view teachers as being more effective based on the instructor's communication style. Gorham and Zakahi (1990) make the case that many teachers regardless of experience are often aware of this relationship, are able to monitor it and can make adjustments. They also go on to stipulate that not all teachers, regardless of years of experience, are properly trained to employ successful skills or strategies to effect moderation of this process. Research by Christophel (1990) goes a step further by linking student motivation to teaching immediacy, which may impact on student learning outcomes.

A New Model

In an attempt to further refine and explain the importance of immediacy behaviors and the perceptions of closeness of online learning environments, Garrison, Anderson, and Archer's (2000) developed a framework called the Community of Inquiry Model. This model attempts to define the dynamics of online learning environments through three types of presence: (1) social presence, the ability of learners to project themselves socially and emotionally, thereby representing themselves as "real people"; (2) cognitive presence, the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse; and (3) teaching presence, the design, facilitation, and direction of cognitive social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Garrison & Archer, 2000).

Teaching Presence

Teaching presence is one of two primary investigative variables of this research. By definition teaching presence is learning environment centered. It is comprised of three components, instructional design and organization, facilitation of discourse (or communication), and direct instruction (See Figure 1.1.). Teaching presence within the Community of Inquiry framework represents behaviors exhibited by an instructor that facilitates or establishes closeness and immediacy toward students.

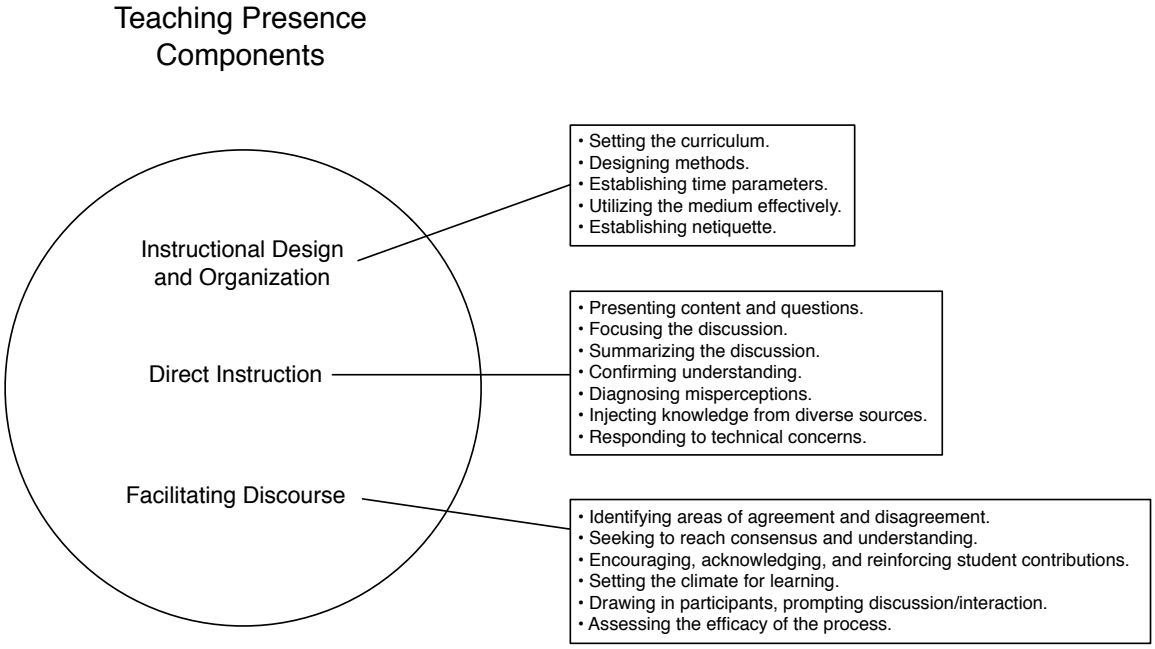

Figure 1.1. Teaching presence components.

Learning Satisfaction

Another line of research established to examine the effectiveness online learning environments includes the broad and less well defined notions of learning satisfaction. Researchers have explored a variety of student reported satisfaction measures as a means

of comparing face-to-face and online learning to argue their equivalency. These investigations have shown a variety of results. Maki, Maki, Patterson, and Whittaker (2000) reported undergraduate introductory psychology students performed better (an average of five percentage points higher) in a distance education course but were generally less satisfied. The authors attributed the higher scores to course design differences for each learning environment. Wang and Newlin (2000) found when comparing online and face-to-face students' final examination scores in a statistical methods course, the online students scored more poorly than the face-to-face students. Spooner, Jordan, Algozzine, and Spooner (1999) examined ratings for two courses taught both online and face-to-face by the same instructor. Their research found no significant differences in overall course grade mean scores. Also, no differences were found when looking at other variables such as students' overall ratings of the course, instructor, teaching, and communication method. Further research by Richardson and Swan (2003) found that the lack of social presence within learning environments affected student motivations, outcomes, and learning satisfaction.

Instructor Satisfaction

A more specific measure of instructor satisfaction was defined by Aleamoni's (1978) Course/Instructor Evaluation Questionnaire (CIEQ). This student centered study measured students' perception of their instructor on the following criteria: (1) the instructor's general interest in students; (2) if the instructor synthesized, integrated, and summarized effectively; (3) whether the instructor encouraged development of new viewpoints and appreciations; (4) if the instructor demonstrated a thorough knowledge of

the subject matter; and (5) whether the instructor has positive about his/her teaching. More distinct descriptions of instructor satisfaction criterion can be viewed in Figure 1.2.

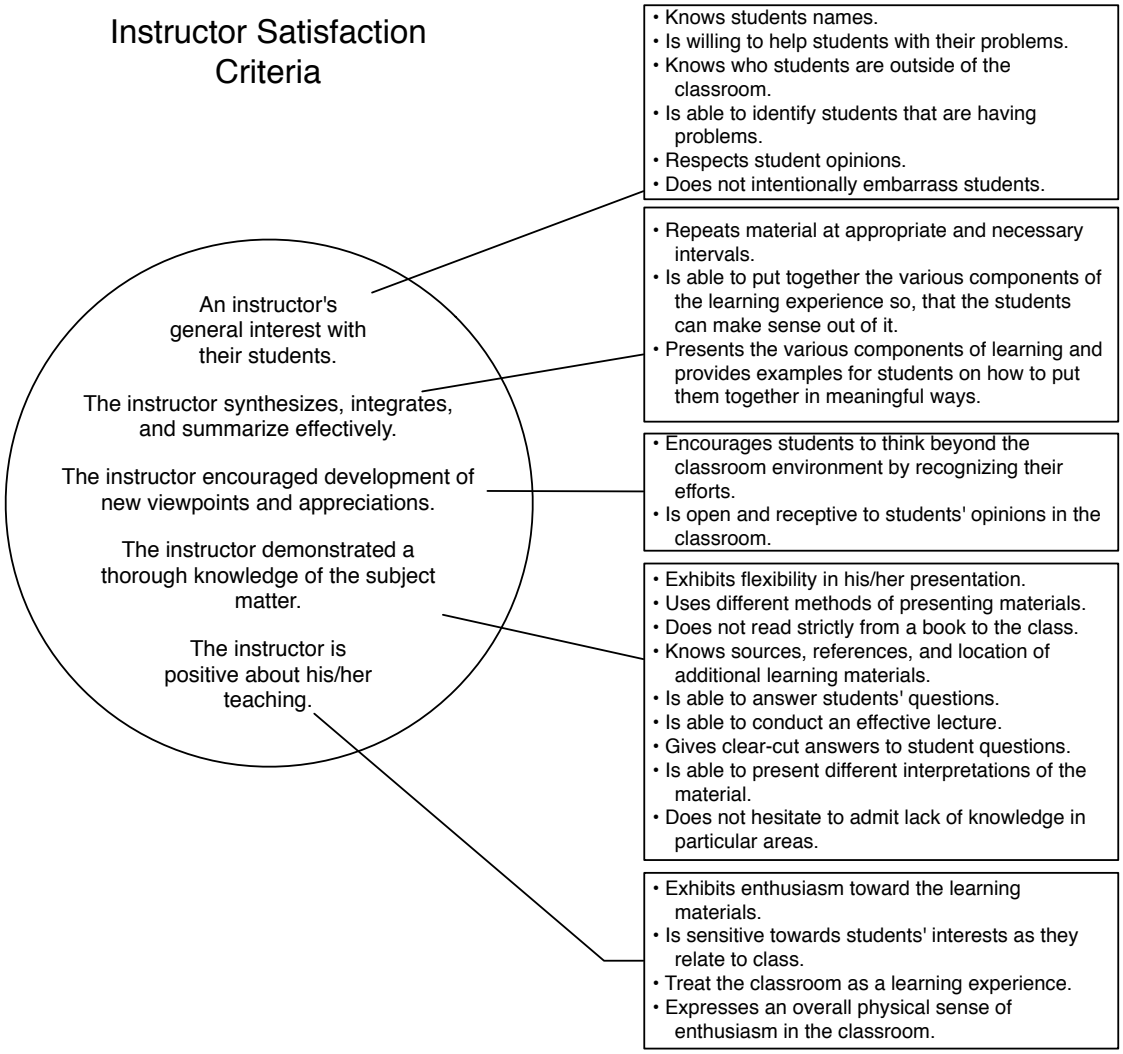

Figure 1.2. Instructor satisfaction criteria.

Teaching Presence Linked with Satisfaction

Early indications between students' perceived learning and satisfaction and teaching presence measured in online learning environments have been found to exist in prior research (Garrison & Cleveland-Innes, 2005; Arbaugh & Rau, 2007; Jiang & Ting,

2000; Picciano, 2002; Shea, Pickett, & Pelz, 2004; Swan, 2001). Swan (2001) found that "interaction with instructors seemed to have a much larger effect on satisfaction and perceived learning than interaction with peers (p. 322-323)." Garrison and Cleveland-Innes (2004) found that teaching presence in the form of facilitation was critical in the success of online learning. Hay, Hodgkinson, Peltier, and Drago (2004) found that interaction—instructor-to-student and student-to-student—was important to achieving overall course effectiveness for both online and face-to-face learning with instructor-to-student interaction being the stronger of the two measures (p. 200).

Purpose of the Study

Since the establishment of the Community of Inquiry framework by Garrison et al. in 2000, various researchers have sought to validate and explain the conceptual components of this model. Like much research within online learning, the seeking of validation or quantification of these components is still emerging. By the same token, research regarding face-to-face learning environments abounds and has been studied much longer, making it a much more maturely studied domain. One aspect that is commonly studied within face-to-face learning research is the instructor satisfaction measure. This measure and resulting outcomes have been used in a variety of ways. One quite common use is as a means of providing instructors with specific feedback about their teaching performances through surveys of students' own perceptions of their learning experience. Generally, in this instance, a positive instructor satisfaction rating typically indicates a job well done and/or a positive connection with students in a

particular course. Often an instructor satisfaction measure also provides guidance and feedback to educators about how they may improve their individual teaching behaviors and overall style.

Throughout the continuum of academic research, online learning environments, for better or worse, have invariably been compared to face-to-face environments in many ways. With regards to the Community of Inquiry Model, looking only at online learning environments limits the scope of the findings, and in this case would only provide half the picture of a single teacher's teaching and learning environment. To date limited research has been conducted to establish or compare whether the Community of Inquiry's core components (social presence, cognitive presence, and teaching presence) are relevant or even existent in face-to-face learning environments. Quite simply the research has not been compared or extended into the face-to-face learning environment. Additionally, thus far the research has also largely been conducted using only relatively small-scale online graduate education environments, with only a few examinations exploring undergraduate collegiate learning environments.

It was the intent of this research to use a course evaluation instrument (CIEQ) to explore instructor satisfaction along with a recently developed measure designed to investigate the Community of Inquiry's core component of teaching presence. Data from these two measures were obtained from undergraduate collegiate students in a single course taught by one instructor both online and face-to-face. Specifically, this study explored whether a relationship existed between student ratings of instructor satisfaction and teaching presence within online and/or face-to-face learning environments. It was

designed with two main objectives: (1) To learn whether statistically significant variations exist in student ratings of these two measures (instructor satisfaction and teaching presence); (2) To discover if there are statistically significant variations between the two measures when examining each within online or face-to-face learning environments.

Finally, from the research conducted in this study the researcher sought to aid in a better understanding of teaching presence as a whole and to establish evidence of the Community of Inquiry's conceptualization of teaching presence within face-to-face learning environments. From these findings the intent was to contribute to the body of academic research regarding the relationship, if any, between instructor satisfaction and teaching presence. Ultimately, the researcher sought to identify and to synthesize from the findings practical ways in which instructors might improve their teaching, teaching presence and sense of community in both online and face-to-face instruction.

Illustration of Variables

Table 1.1
Overall Correlations

Independent variables	Dependent variables
(Delivery modality)	(Measures)
Online	Instructor satisfaction
Face-to-face	Teaching presence

Independent variables for this examination were the students in both online and face-to-face learning environments attending an introductory science course. The dependent variables of this examination were the instruments of measure. Instrument 1- Course/Instructor Evaluation Questionnaire (CIEQ) a course evaluation consisting of question items measuring instructor satisfaction and Instrument 2 - Online Teaching and Learning Questionnaire (TP) consisting of question items measuring teaching presence (See Table 1.1.). The correlation and/or relationship between components of instructor satisfaction and teaching presence were studied in this examination (See Figure 1.3.).

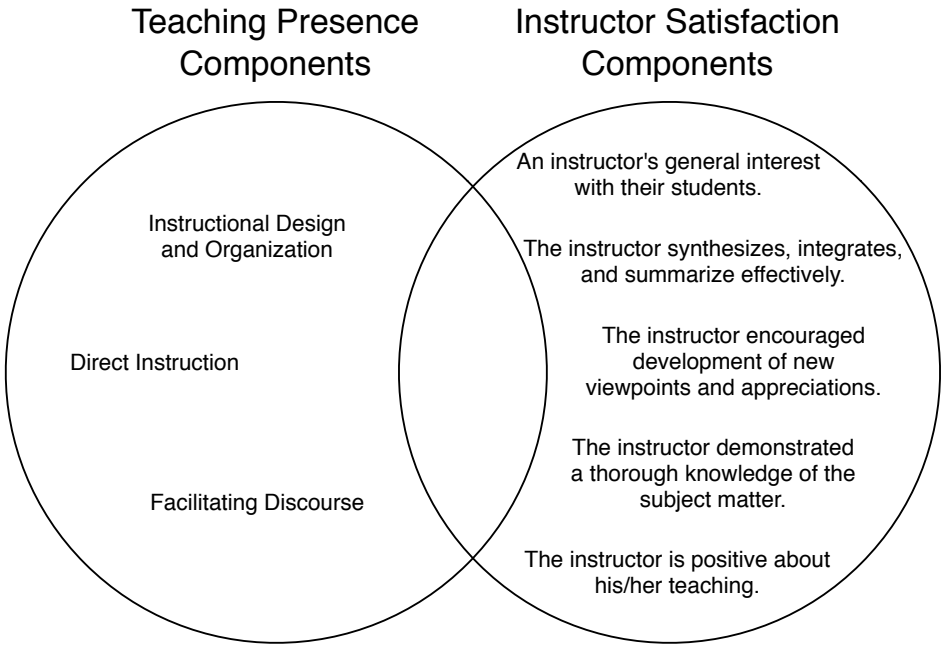

Figure 1.3. Illustration of dependent variables and their relationship to be examined.

Data were collected from students attending both online and face-to-face learning environments. These two learning environments when combine were defined as the independent variable (See Table 1.2.). The dependent variables were defined as measures

of mean scores for instructor satisfaction and teaching presence attained from the respective instruments (CIEQ and TP). A Pearson correlation measure was used to measure the degree and direction of linear relationship between the two dependent variables. A positive relationship did indicate that similarities in mean scores for each instrument of measure were less than random.

Table 1.2
Modality Correlations

Independent variables	Dependent variables
(Delivery modality)	(Measures)
Online	Instructor satisfaction
Face-to-face	Teaching presence

Data were collected from all students attending both online and face-to-face learning environments, which were defined as the independent variables (See Table 1.3.). The dependent variables were defined as measures of mean scores for instructor satisfaction and teaching presence attained from the respective instruments. A statistical Multivariate Analysis of Variance (MANOVA) was employed to investigate the existence of an interaction between two within subject variables. The use of a MANOVA measure was intended to reveal which group or modality (online or face-to-face) was generally most satisfied with their instructor (instructor satisfaction) and reveals the highest response toward teaching presence, and if the two were dependent upon one another.

Table 1.3
Summary of Variables for Multivariate Analysis of Variance (MANOVA)

Independent variables	Dependent variables
(Delivery modality)	(Measures)
Online	Instructor satisfaction
Face-to-face	Teaching presence

Central Research Questions

Is there a relationship between teaching presence and instructor satisfaction as reported by online and face-to-face students?

What role does the learning modality (online or face-to-face) have on the instructor satisfaction, teaching presence relationship and the relationship between them?

Research Questions

1. Does the teaching presence scale "Online Teaching and Learning Questionnaire" (Shea, Li, Swan, and Pickett [2005]) exhibit the same factor structures for teaching presence as exhibited in Shea, et al. (2005) findings when used with both online and face-to-face undergraduate college students?
2. What is the relationship between student perceptions of teaching presence and instructor satisfaction?

   2a. Is this relationship similar when students participate in either online or face-to-face versions of the course?
3. Do mean student ratings of instructor satisfaction and teaching presence differ when instruction is delivered either via online video or face-to-face lecture?

Methods

This causal-comparative study investigated the relationship between student reported instructor satisfaction and measured teaching presence in both online and face-to-face learning environments. The raw total number of collected samples for this examination was $N = 574$. Data were collected from students attending a Midwestern public university by means of two instruments. The subjects for this study were generally undergraduate students enrolled in an introductory Food Science course. Subjects in this study were from two populations: (1) Those attending the course on campus in a traditionally scheduled live lecture session; and (2) Those attending online via an Internet-based experience where the previous live lecture was video recorded and then subsequently posted for asynchronous viewing. All students in the course had access to the same learning materials.

Data collection was done on the last day of class, just after the course's final exam had been administered to the students. Due to the large enrollment of the course and limitations of available adequate examination space, all students had the opportunity to attend one of four scheduled final examination sessions. Once the subjects had entered the room and were properly seated, each subject was given a survey packet consisting of instructions, a statement of purpose, examiner information and Institutional Review Board approval, Instrument 1 - Course/Instructor Evaluation Questionnaire (CIEQ) containing questions regarding instructor satisfaction items together on a single overprinted Scantron® response sheet, and Instrument 2 - Online Teaching and Learning Questionnaire (TP) with questions regarding teaching presence printed on several sheets

of paper (front and back) with an accompanied plain Scantron® response sheet. Testing proctors (four) administered the survey materials. Students were instructed to hand in these same materials once they have completed their final examination just prior to exiting the examination facility.

This study used two instruments to test the notion that two components of quality education, student rated instructor satisfaction and teaching presence are related in both the online and traditional face-to-face instruction environments. Additionally, these two components when linked provided insights to both educators and researchers about effective quality instructional design and course discourse.

The first instrument used was the Aleamoni (1978) Course/Instructor Evaluation Questionnaire (CIEQ), a widely used course evaluation and assessment instrument measures five sub-scales, General Course Attitude, Method of Instruction, Course Content, Interest and Attention, and Instructor. For this examination only the instructor satisfaction sub-scale was examined (See Figure 1.4.).

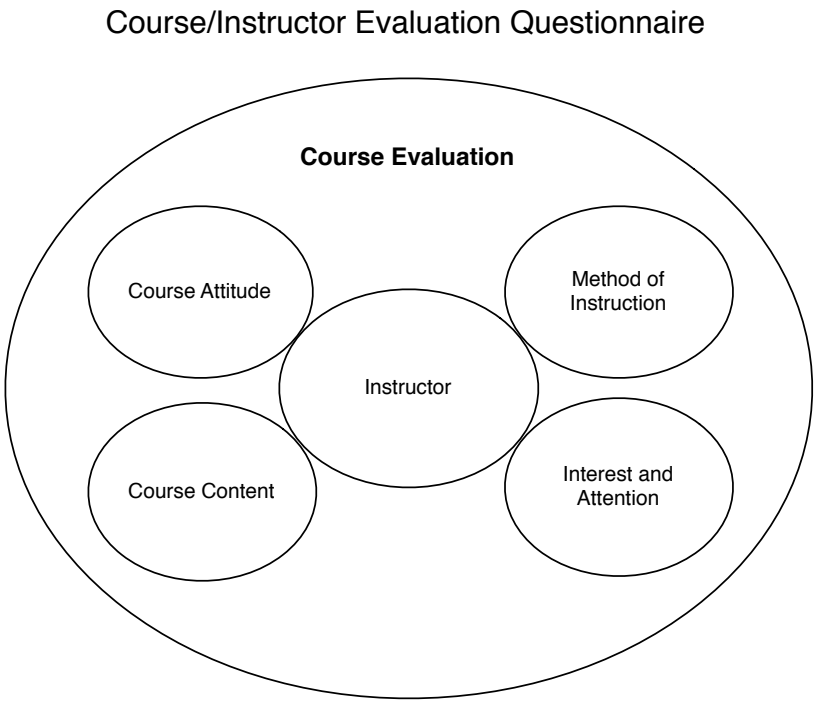

Figure 1.4. Course/Instructor Evaluation Questionnaire (Alemoni, 1975).

The second instrument was from the research of Shea, et al. (2005), which was advised by Andersen. Andersen is one of the original authors of the framework known as the Community of Inquiry Model and a fellow researcher of teaching presence. Teaching presence is one of three components of the Community of Inquiry Model. Andersen's earlier work (1985) suggests that a strong sense of teaching presence connotes immediacy behaviors that indicate approachability, availability for communication, increased sensory stimulation, and communicated interpersonal warmth and closeness (See Figure 1.5.).

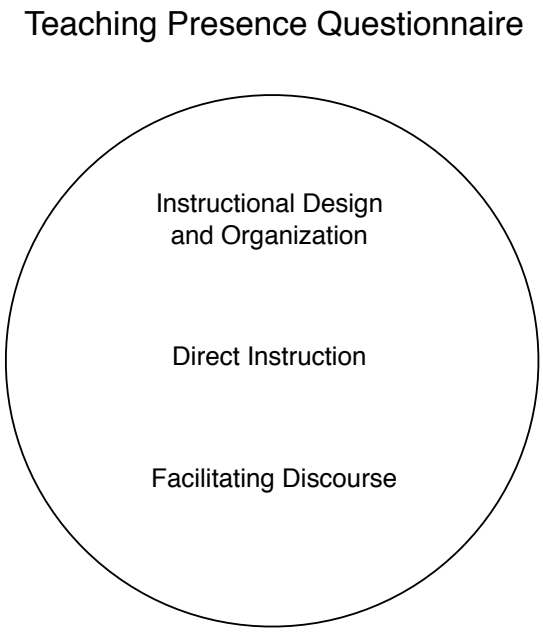

Figure 1.5. Online Teaching and Learning Questionnaire (Shea, Fredericksen, Pickett, Pelz, 2003).

Statistical confirmatory factor analyses, corollary analyses, *t*-tests, and a MANOVA statistical analysis were used in this investigation. Corollary analysis took place looking on instructor satisfaction and teaching presence as they related to one another within the two measured learning environments, online and face-to-face. *T*-test examinations were used to examine mean scores for differences between the two learning environments (online and face-to-face) and instructor satisfaction. Lastly, differences were sought to examine variations in the relationships that exist within in four variables: instructor satisfaction, teaching presence, online, and face-to-face learning environments.

Target Audience for this Study

Faculty, students, and administrators in higher education should benefit from the results of this study through expanding the knowledge base on teaching presence in

online environments. Particularly those instructors who teach in online environments and administrators with direct responsibilities over areas related to these environments should see a relationship between their work and this study.

Significance of Study

While research regarding online distant learning abounds, few studies explore the relationship between undergraduate student satisfaction regarding the instructor, learning community, and teaching presence. Moreover, of studies that have explored these concepts only a few compare their results with undergraduate students taking the same course face-to-face. Teaching presence as defined by Garrison and Cleveland-Innes, (2000) is one of three primary component of the Community of Inquiry Model. In their model teaching presence is conceptually aimed at exploring specifically the instructor-student relationship within online learning environments. Shea, et al. (2003) define teaching presence as consisting of design, facilitation, and direction of cognitive and social processes for the realization of personally meaningful and educationally worthwhile outcomes. Teaching presence has three components: instructional design and organization, facilitating discourse, and direct instruction (p. 65). This study sought to identify and to further define items that connect teaching presence with instructor satisfaction.

The content of the course that was studied was singularly varied only by its delivery mode. All course content was identical. Online students received the exact same lecture materials and instruction as face-to-face students. The online lecture content was a

delayed video stream version of an earlier (same calendar day) live face-to-face lecture delivered via the Internet. Both online and face-to-face students received all other course materials through a university run Course Management Systems (CMS). The strong similarity in presented course content, learning materials delivered, and student course work expectations made for a unique study of the learning environment where instructor variation was primarily only denoted by the type of delivery received by the participants. The vast majority of studies investigating student rated instructor satisfaction or teaching presence have by-and-large only looked at either face-to-face or online learning environments exclusively.

Limitations

According to Patten (2005), the main criterion during sampling should be to obtain an unbiased sample. As stated by the author, an unbiased sample is one in which every member of a population has an equal opportunity of being selected. There is a limited generalizability and a potential for bias from the findings presented here due to the absence of a randomization of the selected sample participants. This may have affected the relation of these findings to more diverse populations such as graduate, community colleges, and other such institutions. Therefore, caution should be exercised when generalizing the interpreted findings to other populations.

Limits to correlation research apply; this type of research does not tell the researcher whether or not the relationship explored was of a causal nature. In other words, correlation does not and cannot determine or prove causality. Correlation research

can only demonstrate that a relationship exists between two variables in some systemic way (Argyrous, 2000, p. 138).

This study used a nonprobability convenience sampling as its method for selection of participants. One limitation to nonprobability convenience sampling is that sampling error cannot be calculated. The findings may not be generalized to be representative of any other population than the sample frame.

There may exist the possibility of unidentified secondary variables, which may have affected the relationship between the primary variables examined.

Students were asked to reflect upon past activities or events at the termination of the semester may not have reported their recollections accurately. Feelings and emotions held by students may have been recorded differently if data collection had occurred at another time.

A more sensitive research instrument than the two chosen may existed, however, to the best of this researcher's knowledge, such was not the case at the time this research was conducted.

All findings in this research should consider strongly all of these limitations.

Assumptions

The assumptions for this study are as follows:

- Students responded with honest intentions to both instruments.
- Students were able to make clear judgments regarding the questions asked of them on both instruments.

Definition of Terms

Course management system: The means of disseminating materials electronically is done via a structured database known as a course management system. CMSs are quite common in post-secondary education. The students in this sample all accessed course materials using the Angel® course management learning system.

Face-to-face learning: Face-to-face learning is defined as learning course content by means of students attending a physical facility at specific times or intervals as part of a collegiate campus setting designed for instruction of students. This may consist of either a classroom or lecture hall setting whereby instructors and/or assistants attend profess knowledge specific to their specialty for the sake of students' intellectual advancement. Students in this setting learn from the direct and personal communication of the instructors and/or assistances while attending.

Instructor Satisfaction: A rating of teacher performance collected from students. A statistical measure gathered from enrolled students that indicate the participants personal feelings about the overall performance in the learning environment provided by the instructor.

Modality: Modality refers to the means by with educational materials are taught. For the purposes of this discussion, modality is limited in its meaning to either face-to-face or online learning.

Online learning: Unless otherwise stated for the context of this analysis online learning is defined as the learning environments or methods other than traditional face-to-face classroom learning. Most notably for this discussion the term connotes the

dissemination, reception, and collection of all learning materials and exams for learning via the use of the Internet, World Wide Web, or computer mediation in a place other than the traditional classroom or facilities attended by those students receiving traditional collegiate instruction. Particular to this study online learning represents the reception of course lectures via Internet delivered streaming video.

Teaching Presence: Teaching presence is the ability of instructors to project themselves in an online learning environment and is one of the three core components of the Community of Inquiry Model. Anderson, Rourke, Garrison and Archer (2001) define teaching presence as "the design, facilitation and direction of cognitive and social processes for the purpose of realizing (students') personally meaningful and educationally worthwhile outcomes." Teaching presence from the Community of Inquiry Model is comprised of three major components: instructional design and organization, facilitating discourse, and direct instruction.

CHAPTER II

Review of Literature

Distance Education: A Historical Perspective

During the Industrial Revolution in both North America and Europe in the mid-nineteenth century, movement of people by rail became common. From this movement of people and goods over the ever-expanding rail system came the advent of study by correspondence (Keegan, 2000). In the United States, the University of Chicago established the largest correspondence program between 1883 and 1891 (McIsaac & Gunawardena, 1996). As the United States Postal Service expanded across the country with ever increasing efficiency and timely deliveries, correspondence courses were established to allow those who could not afford a higher education the an opportunity to do so.

As is the case with many changes in education, the correspondence programs were not initially highly regarded and were met with much skepticism. As technologies evolved, the effectiveness of distance education programs increased (McIsaac & Gunawardena, 1996). At the outset most distance learning programs relied on printed text and correspondence as the sole means of communication. In the twentieth century as technologies such as radio and television emerged, distance education programs began to transform their delivery mechanisms for distance learning (McIsaac & Gunawardena, 1996).

The late 1950s witnessed the launch of Telestar, the first active, direct relay communications satellite. By 1962 the University of South Africa established the first

distance university courses. By the end of the 1960s another major distance learning program was established, the British Open University (UNISA) in 1969 (Simonson, Smaldino, Albright, & Zvacek, 2000; McIsaac & Gunawardena, 1996). Coincidentally, throughout the 1960s television began to establish itself as the dominant communication system globally. It was through the evolution of television technology that distance education itself truly began to emerge. Tele-course initiatives, at the State University of Nebraska (SUN project) were being viewed as creditable and viable options for many wishing to seek greater educational opportunities. By delivering both live and videotaped audio and visual instruction , television made it possible to supplement learning materials that up until that time had largely been reliant on print-based instruction.

The 1970s saw continued advancements in television and other emerging technologies such as fiber-optic and digital switching. This continued to contribute to the expansion of the digital age. The merging of wired terrestrial communications within the telephone industry combined with the established satellite technologies led to the emergence of global communications networks. Along with these emerging networks came the 1976 introduction of the first personal computer (PC) by Apple Computer, ushering in the era of computer use for the masses. All that remained was for these technologies to come together in some meaningful form. Meanwhile, at universities and throughout the business community, worldwide mainframe computers increasingly began communicating with each other through wired digital networks. These networks used a unique method of transmission and reception of information or data known as packets. Packets consist of discrete blocks of information which are then routed over shared

networks (both wired and wireless) between nodes. Within a few short years what is now known as the Internet and the World Wide Web (WWW) brought about the reality of live global communication for everyone. As this communication began to link more and more mainframe computers and their masses of stored information together, the revolution of instant access to information began to be realized, as well. The final hurdle to McLuhan's (1962) predicted vision of a global village was in place and being realized by the mid-1990s. The Internet and the WWW became widely accessible to the public and their PCs through the use of a cheap and simple electronic device known as a modem. The modem had been previously available to the public in various forms for more than twenty years, but now it provided users with the capability of decoding and encoding packet communications over a simple telephone line. This communication line could then be linked to the Internet and the WWW by merely dialing any one of a number of commercially available Internet gateway service providers. Though initially limited and slow, Internet-based communications have evolved with ever-increasing access, lower costs and faster transmission speeds.

Today, we see in the United States over 61.8 percent of the citizens are using PCs, and of these PC users, at least 54.1 percent have Internet access (National Telecommunications and Information Administration (NTIA), 2004). Continued advancements in technology, lowering of costs, and increased communication speeds, all indicate these figures are poised to increase with time.

Defining Distance Education

From its inception distance learning has been linked with traditional classroom education (Hiltz & Goldman, 2005; Swan, 2004a). Traditional classroom instruction provided the original groundwork for distance learning instruction. By the same token, distance learning education has aided in the evolution of traditional classroom education immensely. From its foundation distance education has attempted in one way or another to emulate the positive aspects of traditional learning. Traditionally one of the implicit goals of distance education is to provide a set of equal outcomes to the learner as those found in face-to-face instruction.

There are a variety of theoretical perspectives within the discipline of distance education and distance learning. As with traditional education, from continued research within the field various definitions have evolved. There are several definitions of what comprises distance education from differing points of view. Rudolf Manfred Delling's (as cited in Keegan, 1996) defines distance education as a

> ...planned and systematic activity which comprises the choice, didactic preparation and presentation of teaching materials as well as the supervision and support of student learning and which is achieved by bridging the physical distance between student and teacher by means of at least one appropriated technical medium (p. 57).

Desmond Keegan (1980) outlines six key elements of distance education:

1. Separation of teacher and learner.
2. Influence of an educational organization.

3. Use of media to link teacher and learner.
4. Two-way exchange of communication.
5. Learners as individuals rather than grouped.
6. Education as an industrialized form.

Hilary Perraton (1981) defines distance learning this way: "Distance teaching is an educational process in which a significant portion of the teaching is conducted by someone removed in space and/or time from the learner" (p. 13).

Primarily due to technological advancements, the definition of distance education is slowly changing as educational theorists and educators reconceptualize the field. With new and more immediate communications continually emerging these forces have driven by-and-large the current climate of educational institutions embracing and expanding distance learning programs. Many of these technology changes have shown increased abilities toward group communication and interactivity. They challenge some of Keegan's 1980 earlier notions.

Looking forward and into the future, other revisions of the definitions for distance learning have come to refine a more student-centered approach. Holmberg (1989) refined the definition from this perspective, stating that

> Distance education is a concept that covers the learning-teaching activities in the cognitive and/or psycho-motor and affective domains of an individual learner and a supporting organization. It is characterized by non-contiguous communication and can be carried out anywhere and at any time, which makes it attractive to adults with professional and social commitments (p. 168).

Perhaps the most current definition is one posited by Simonson (2003). His definition of distance education is often cited and is widely accepted today: "…is an institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors" (p. vii).

Most definitions of distance education imply some means of communication between two or more parties being held either over a great physical distance or timeframe. The environment is thus explained as being mediated. At present, this mediation is typically done through the use of some form of technology. The mediation in distance learning environment most often is done via an appropriate communication technology used to substitute face-to-face instruction. In today's world with most distance learning environments relying on Internet or WWW technologies, computer mediated communication (CMC) occurs between two or more people across computer networks. The CMC are drawn from computer software that provides content in text form, graphical illustration, audio-visual, or all three, in addition to, other emerging forms of communication technologies (Thurlow, Lengel, & Tomic, 2004, p. 32).

Definitions for distance learning undergo further refinement to reflect the context in which they exist and the differing state of technologies used to employ their delivery. Other distance education research has examined the inner workings of the distance learning environments itself, attempting to understand the mechanics of human interactions and communications within these mediated environments. Principle amongst the theories to emerge resides the notions and workings surrounding the human sense of

presence. Conceptual frameworks have been devised which attempt to explain the interrelationships that exist between varying types of presence experienced in distant learning environments. Most notably is the research of Garrison and Archer (2000) through their framework known as the Community of Inquiry Model.

Online Learning Perspectives

The online learner

Within the online learning environment, the student is placed at the center of all the learning activities. Each learner brings to the learning environment a unique set of characteristics, such as demographics, cognitive ability, cultural values, and motivation. In recent years much has been written about the online learner (Gibson, 1992; Holmberg, 1989; Simonson, Smaldino, Albright, & Zvacek, 2000).

Gibson's (1992) research investigated characteristics of the online learner. In her research she specifically looked at the adaptable nature of the online learner. While Hiltz, Arbaugh, Benbunan-Fich, & Shea (2004) building on prior research conducted by Simonson, Smaldino, Albright, & Zvacek (2000), proposed that distance education students who are motivated, self-directed, and confident are most likely to thrive in the Asynchronous Learning Network (ALN) environment (p. 117). Other research by Jegede (as cited by Buchanan, 1999) identified online learners as having characteristics that included, autonomy, persistence, independence, self-direction, and flexibility. Additionally, Buchanan's research defined maturity, self-discipline, and assertiveness as inherent to successful distance learners.

Demographically Halsne and Gatta (2002) revealed that online learners are most likely to be Caucasian, female, part-time students with full-time professional work who generally performed better than on-campus students. This coincides with previous findings from Holmberg (1995), Schrum and Luetkehans (1997), and Feasley (1983). Their research reveals distance learning students tend to be over 25 years of age. In more specific research conducted by Holmberg (1995), it was noted through a survey of distance learning research cast over three decades that the age range of 25-35 was most characteristic for online distance learners in most institutions.

Learning online

Much research has been conducted examining online student learning (Burden & Byrd, 1998; Marzano, 2003). This research has been primarily linked to classroom or face-to-face instruction through comparative analysis. When discussing online learning outcomes and online student learning, by-and-large the measure has typically been face-to-face instruction (Hiltz & Goldman, 2005; Swan, 2004a). As mentioned previously, online distance learning has been thought to be effective if it delivers equivalent results to those measured for other modalities, primarily classroom-based instruction. With respect to new and emerging theories, recent research surrounding online learning has begun to look for ways to define and distinguish unique characteristics of online distance teaching and learning from traditional face-to-face learning (Koory, 2003; Swan, 2004b). Garrison (2003) has shown support for reflective inquiry, while Moore (1990) and Swan (2002) have approached the arena from a basis of inquiry regarding overall interactivity between all parties (instructor and students) in the online learning realm. This extended to the

notion of collaboration, which has shown support from Alavi (1994), Scardamalia and Bereiter (1996), Benbunan-Fich and Hiltz (1999), and Rovai (2002). Additionally, these findings help to reinforce the notion that pedagogical factors may serve as the focal point for online learners' success.

Instruction online

Many scholars (Arbaugh, 2000, 2001; Arbaugh & Duray, 2001; Jiang & Ting, 2000; McIsaac, Blocher, Mahes, & Vrasidas, 1998; Smith, Ferguson, & Caris, 2001; Swan, 2002; Swan, Shea, Frederickson, Picket, Pelz, & Maher, 2000) have conducted research investigating the role of instructor interactions, behaviors, and pedagogical practices as they relate to online student satisfaction and outcomes in the online learning space. Examples in several studies (Andriole, 1997; Arbaugh, 2001; Picciano, 2002) found that instructor interactions while learning online—the use of humor, the use of personalized examples, and calling on or addressing students by name—show a strong link to student outcomes. In Shea, Swan, Frederickson, and Picket (2002) evidence revealed a strong correlation between satisfaction and learning with interaction, feedback, and clear expectations.

How an online course is designed can have an impact on outcomes as well. Irani, Scherler, Harrington, and Telg's (2000) study showed that engagement of the online students through the use of an authentic context and problem-based tasks is important for the facilitation of the online student. This reinforces research conducted by Swan (2001) in which she found that providing three key elements—clarity of design, interaction with instructors, and active discussion among course participants—resulted in significant

learning gains. Arbaugh and Hwang's (2006) research also suggests that deeper levels of understanding were less likely to exist without instructor support. It is suggested that students experience greater cognitive gains when instructors facilitate communities of inquiry where collaborative-learning activities are used to scaffold and sustain reflective discourse (McCombs & Vakili, 2005 as cited in Bangert, 2006, p. 37).

Student satisfaction

Reports in current research indicate that online students are generally satisfied with their educational experience. This research shows that students when comparing their online educational experience with their own traditional face-to-face learning experiences tend to respond to their distance learning experience is at least as satisfying as their face-to-face experiences (Jennings, Siegel, & Conklin, 1995; Potts & Hagan, 2000). Going beyond measuring simple satisfaction in learning, Bower and Kamata (2000) looked at specific course aspects such as course administration, course instruction, access, and delivery format. Their research revealed most students were satisfied or very satisfied with their course. Students also reported that they would be likely to participate in another online course.

A recent line of research investigated correlations between the three factors (social presence, teacher presence, and cognitive presence) of the Community of Inquiry Model. Shea, et al. (2004) found that students who gave high ratings to instructional design and organization (the first component in the model) in their courses also tended to rate their satisfaction and learning high. Shea, et al. (2003), when looking at factors of teaching presence (one aspect of the Community of Inquiry Model), found an association

between interaction and satisfaction within online courses and reported finding a significant correlation between satisfaction and two other factors—feedback and clear expectations.

Presence

Presence and the understanding of it constitute a great deal of debate within distance learning. Merriam-Webster (2005) defines presence as "the fact or condition of being present". Within the foundations of human-to-human communications, presence is the context from which other sub-disciplines have emerged for discussion by theorists. These sub-disciplines of social presence, teacher presence, and cognitive presence will be examined further in this section.

What is presence and why is it important? The sense of presence defines the natural human sense of connection to someone or something. Biocca (1997) describes this very human phenomenon as follows: "When we experience our everyday sense of presence in the physical world, we automatically generate a mental model of an external space from patterns of energy on the sensory organs." It is a part of the human condition to attempt to make sense out of our condition. In various aspects presence has provided the mental foundations of religion, the sciences, and the arts. Presence can be either real or imaginary. Simply stated, it provides for the individual an anchor to an environment or a sense of "being" or "purpose" (Loomis, 1992). Presence is how humans attempt to make sense or mental connections to their environment or a mediated space.

Social Presence

At the core of the discussion of distance education lays the insurmountable paradoxical issue that educators and students are separated. Early researchers studying radio (Arnheim, 1957) and film (Munsterberg, 1916) relied heavily on Gestalt psychology theory to explain how the given mediums affected human senses. In the 1960s Marshall McLuhan assembled a controversial theory in Understanding Media to exploring the imbalances brought about by technology and electronic medium in the sensorium, or the effect media had on the senses. He attempted to explain how humans perceived and made sense of their environs through media.

The limitations imposed by the delivery technologies or mechanisms are viewed as inadequate substitutes for actual face-to-face communications (Ciampa, 1989; Palmer, 1995; Rafaeli, 1988; Schudson, 1978). It is from this perspective of both immediate and non-mediated learning that the notion regarding social presence was spawned (Short, Williams, & Christie, 1976; Rice, 1993). As stated by Biocca (1997), "If mediated communication is an inadequate substitute for face-to-face communication, then to what degree does a medium simulate the face-to-face presence of another? What degree does a user feel the social presence of another?" (Being with Another Body: Designing the Illusion of Social Presence section, para. 4). This is the question many distance education theorists are attempting to resolve.

Simply put, social presence is the measure of community an individual feels within a given environment. In distance learning, social presence and the encompassing theories have taken on a measure of importance due to the mediation of the environment.

Questions regarding the effects of mediation on the learning environment are what many researchers are attempting to answer. Researchers such as McIsaac and Gunawardena. (1996) and Short et al. (1976) have regarded social presence as the most important perception that occurs in an environment for humans. The researchers go on to emphasize that it is this aspect of presence that provides the foundation for person-to-person communications.

Because there are less communication cues in a mediated learning environment, researchers have been explicitly interested in examining user's perceptions of another intelligence. Researchers such as Short et al. (1976) initially attempted to measure social presence through semantic differential techniques such as: sociable/unsociable, personal/ impersonal, sensitive/insensitive and warm/cold. Tu (2002) argued that such instruments did not consider other important variables such as privacy, recipients, and topics.

The context of social presence involves two distinctive concepts, intimacy and immediacy. Intimacy, first discussed by Argyle and Dean (1965), is a response to such things as eye contact, physical proximity, and topic of conversation. Burgoon, Buller, Hale and deTurck (1984) suggest that maintained eye contact, proximity, body leaning forward, and smiling conveyed intimate communication between two parties. Short et al. (1976) suggests that when an uncomfortable degree of intimacy seems to be present for one party of a communication then that individual will attempt to seek a more comfortable level, called an equilibrium, by altering behavior is some manner.

Immediacy as defined by Wiener and Mehrabian (1968), is the psychological distance between a communicator and the recipient of the communication. Walther and

Burgoon (1992) further describes immediacy as being conveyed through speech and its associated verbal and nonverbal cues, this giving the user the ability to alter the state of immediacy.

Tu (2002) proposed further refinement of intimacy and immediacy by suggesting three additional sub-categories or dimensions (See Figure 2.1.). These three dimensions are comprised of interactivity, social context and online communication.

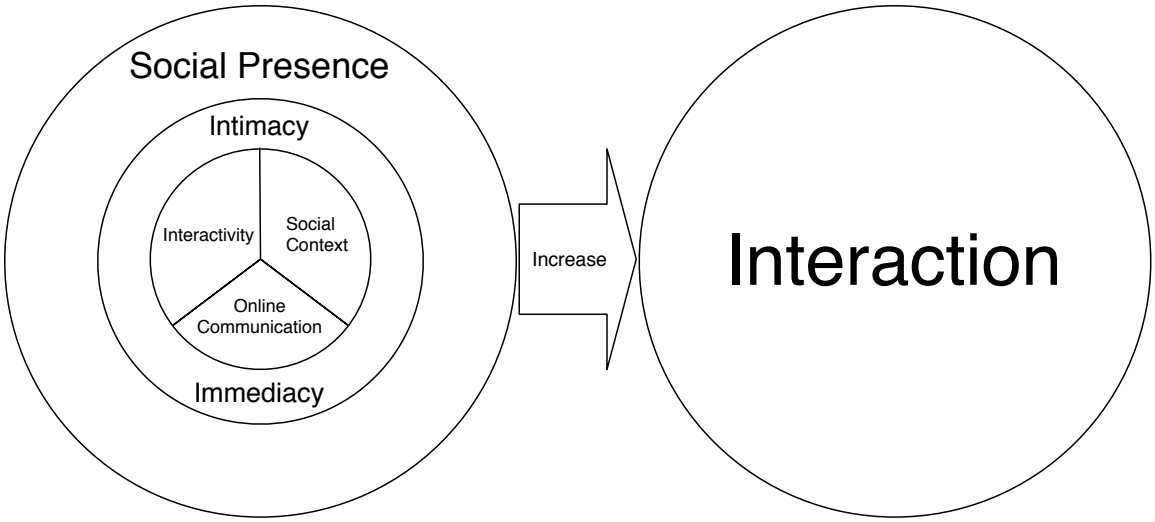

Figure 2.1. Social Presence and Interaction (Tu & McIsaac, 2002).

Interactivity

Norton (1986) outlined eleven communication styles (impression-leaving, contentious, open, dramatic, dominant, precise, relaxed, friendly, attentive, animated, and communicator image) which could be associated with social presence in a CMC environment. Interactivity is comprised of the communication activities a CMC user uses and engages in while participating in a distance education environment. In an asynchronous environment, communication is often delayed or not immediate. This low

immediacy can effect or decrease a CMC user's sense of social presence.

Social Context

Social context comprised of six notions such as task orientation (Steinfield, 1986), topics (Argyle & Dean, 1965; Walther & Burgoon, 1992), privacy (Champness, 1973; Steinfield 1986), social relationships/recipients (Walther & Burgoon, 1992; Williams & Rice, 1983), and social process (Walther & Burgoon, 1992) make up the degree of social presence. For example, "When the conversation is task oriented and more public, the degree of social presence will degrade." (Tu & McIsaac, 2002, p. 134)

Steinfeld stated that task complexity, task interdependence, environmental uncertainty, and the need for communication across distant locations were positively associated with increasing task orientation in computer-mediated-communications messaging.

Additionally, Walther and Burgoon (1992) suggested that it was from social relationships that change was presented in interactions. Walther found that CMC users tended to have limited communication at first, but as time passed the CMC users began to develop social relationships. These relationships were formed from the CMC users impressions of others from the simple text-based information conveyed. Gunawardena and Zittle (1997) found that CMC users became more social with one another over time and exchanged more personal information as time between users increased.

A CMC user's sense of privacy effects the degree of social presence they report. Less private settings result in a decrease of reported social presences by CMC users. Champness (1973) reported that users in a videoconference felt less private and more

public with a lower perceived amount of social presence.

Online communication

Because of the very nature of CMC, users need to have already acquired some technical skills that allow them to communicate using a computer. These are most commonly typing skills due to the text-based nature of a large degree of the communications in online learning environments. However, users also need to have some level of comfortability with the computer and computer based technologies. Garramone, (1986) state the more active users were in participating in bulletin board communications online, the more social presence was perceived, while Perse, Burton, Kovner, Lears, and Sen, (1992) found that social presence increased as users reported higher comfortability levels with their computers.

The most current body of research debates whether social presence has a casual or correlational relationship with course outcomes and social presence's role in facilitating cognitive development and critical thinking (Arbaugh, 2007). Garrison and Cleveland-Innes (2005) suggest that social presence is not the lone factor in developing critical thinking and inquiry in a CMC learning environment. It is, however, difficult for this type of discourse to exist without it. Picciano's (2002) research has attempted to separate the understandings of interaction or interactivity in the distance learning environment from presence, specifically cognitive presence. His research claims that online interactivity showed no correlation with cognitive presence. Other recent research by Beuchot and Bullen (2005) suggests increases in sociability leads to increased interaction, implying that social presence is critical for the existence of cognitive presence.

Teaching Presence

Mehrabian (1971) suggested it was through the conduit of immediacy that a positive attitude from the sender was transmitted to the receiver. Mehrabian suggests that immediacy and liking are linked as stating, "two sides of the same coin. It is, liking encourages greater immediacy and immediacy produces more liking (Mehrabian, 1971, p. 77). Hurt, Scott, and McGroskey (1978) note that the difference between knowing and teaching is reliant upon communication in the classroom (1978). It is from these launching points that teacher immediacy stems. Andersen (1985) notes that immediacy behaviors indicate approachability, availability for communication, increased sensory stimulation, and communicated interpersonal warmth and closeness. Burgoon et al's. (1984) research and the subsequent findings mentioned earlier support this notion. It is from this point that others have attempted to link the following premise: if increased availability and willingness to communicate enhance teacher-student relationships, then there exists the potential that learning may be positively effected or translated.

In order to understand teacher immediacy more thoroughly, there is a need to understand more clearly the two components that comprise the effect and the related research.

Nonverbal teacher immediacy

A great deal of research has been done in the nonverbal realm with respect to teaching immediacy. Andersen (1979) suggests that nonverbal communication cues such as eye contact, gestures, relaxed body position, directing body position toward students, smiling, vocal expressiveness, movement, and proximity increased affective learning.

Others such as Chaiken, Gillen, Derlega, Heinen, and Wilson (1978) or Richmond, McCroskey, Plax and Kearney (1986) suggest both proxemic behaviors and students' perceptions of a teacher's nonverbal immediacy positively relate to students' learning. However, Richmond, Gorham, and McCroskey (1987) contend it is not the measure of immediacy that effects the notions of cognitive learning by students, suggesting that moderate amounts of immediacy may be required in order to show real gains in cognitive learning. Stating low immediacy on the other hand may suppress cognitive learning, while high immediacy may not increase cognitive learning above moderate immediacy.

In an attempt to answer why immediacy influences cognitive learning, Andersen (1985) suggests—and is supported by Kelley and Gorham (1988)—that proximity increases arousal, which primes both teacher and student for cognitive learning. Kelley and Gorham's (1988) research goes a step further in attempting to define which cues establish this prime condition. They suggest a positive correlation exists between high eye contact, high physical proximity, and short-term cognitive recall.

Verbal teacher immediacy

Like nonverbal immediacy, verbal immediacy has been argued also to have an effect on teaching. Conville (1975) found that low verbal immediacy tended to convey the communicator as having positive character traits, but more authoritative. Bradac, Bowers, and Courtright's (1979), review of the research surrounding verbal immediacy found, that high immediacy tended to have a positive effect and verbal immediacy, when related to the source, was judged to be indicative of a source's competence and character. Andersen (1981) found that perceptions in both teacher immediacy and teacher

communicator style were positive correlates. Teaching style also showed a positive relationship in effective learning and behavioral intent but showed no relationship with cognitive learning. Wheeless (1976) and Wheeless (1978) in two studies suggested that self-disclosure and solidarity are linked. Higher levels of reported self-disclosure showed an increase in solidarity. No research regarding nonverbal immediacy showed any results when related to cognitive learning.

Perhaps the most relevant definition for teaching presence as it relates to today's CMC and online learning environments is the one provided from Anderson, Rourke, Garrison, and Archer (2001):

> … as the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes. Teaching presence begins before the course commences as the teacher, acting as instructional designer, plans and prepares the course of studies, and it continues during the course, as the instructor facilitates the discourse and provides direct instruction when required (p. 5).

Of the three presence domains in the Community of Inquiry Model, teaching presence's research has been somewhat lacking prior to the Internet and other CMC mechanisms (Garrison et al., 2000). Shea, et al. (2003) in their survey of research since this period found that the primary body of research regarding teaching presence has only been through transcription analysis or used only basic statistical techniques such as frequency distributions and correlational analyses.

At present, recent research on teaching presence has begun to focus primarily on

two areas: empirical verification of dimensionality of the construct and the extent to which teaching presence relies upon the actual presence of the instructor in the online course (Arbaugh, 2007, p. 75). Of these findings "Instructional Design and Organization" has emerged as a shared construct within two studies (Shea, 2006, and Arbaugh & Hwang, 2006). This is echoed and expanded further by LaPointe and Gunawardena (2004) who found a positive relationship between course design, direct instruction, and perceived teaching style. Other studies (Conrad, 2002, and Stein, Wanstreet, Calvin, Overtoom & Wheaton, 2005) show support for instructor presence as a means of building community and mitigating student anxiety with online communication (as cited in Arbaugh, 2007, p. 75).

Cognitive Presence

Cognitive presence is necessary in the establishment and maintenance of cognitive learning. Within a virtual environment such as a CMC, cognitive presence represents the level by which an individual is attentive and actively processing or employing critical thinking skills. It is this component of critical thinking that Garrison (1991) and Garrison and Archer (2000) first defined as cognitive presence that relates to education and CMC environments. A recent definition of cognitive presence provided by Garrison views cognitive presence as "the exploration, construction, resolution and confirmation of understanding through collaboration and reflection in a community of inquiry" (2007, p. 65). Cognitive presence is viewed by researchers as the most difficult of the three forms of presence established in an online learning environment (Celani &

Collins, 2005, Garrison & Cleveland-Innes, 2005; Moore & Mara, 2005) as critical thinking by the learner can be effected by a variety of factors. Moore (2002) argues that CMC learning environments are more appropriately suited for greater cognitive presence than traditional face-to-face environments simply by the nature of the learning environment having less social distractions and interpersonal communications.

Garrison and colleagues represent cognitive presence as having four phases: (1) a trigger event, whereby a problem or issue is presented for further inquiry; (2) exploration, where learners explore the problem or issue together or individually; (3) integration, where the students construct meaning from the notions posited during exploration; and (4) resolution, students apply the gained knowledge to an educational or workplace context.

The establishment of cognitive presence in a learning environment provides an environment whereby critical thinking is occurring. "When there is good cognitive presence, the focus of discussion becomes ideas in contrast to social factors" (Moore, 2002, p. 62). When related to social presence and teaching presence, cognitive presence is the domain as the learners must engage in in-depth critical thought and reflection a key characteristic of higher education (Dauer, 1989; Dewey & Small, 1897).

Community of Inquiry

Garrison et al. (2000) introduced their Community of Inquiry Model in an attempt to establish a framework for understanding the elements of interplay in human communication through a computer-mediated environment. The elements consist of

social presence, teaching presence, and cognitive presence (See Figure 2.2.).

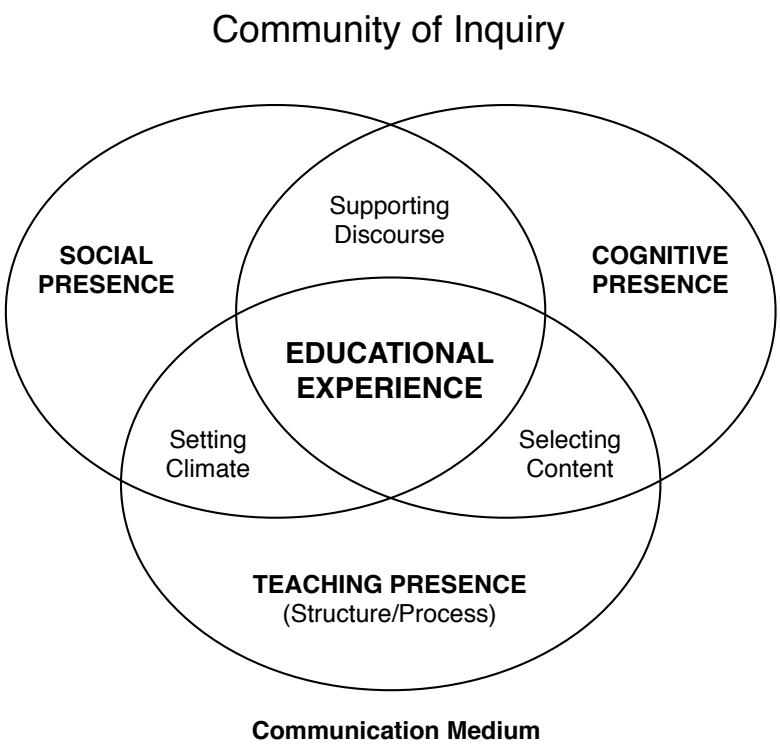

Figure 2.2. Elements of an Educational Experience (Garrison, et al., 2000).

Dubbing their framework as a collaborative constructivist perspective on the teaching and learning transaction (Garrison & Archer, 2000) state,

> This perspective views an educational experience, in its best manifestation, as a collaborative communication process for the purpose of constructing meaningful and worthwhile knowledge. Collaboration is seen as an essential aspect of cognitive development since cognition cannot be separated from the social context (Garrison et al., 2000, p. 92).

At present, perhaps the most meaningful definition for a community of inquiry comes from Garrison and Cleveland-Inness (2005), stating:

> A community of inquiry is more than a social community and more than the magnitude of interaction among participants. A community of inquiry is the integration of cognitive, social, and teaching presence. Considered together, the three presences address the qualitative nature of interactive inquiry consistent with the ideals of higher education. To appreciate interaction and the quality of learning outcomes, one must understand how cognitive, social, and teaching presence come together to create a purposeful community of inquiry (p. 134).

Thus interaction does not guarantee meaningful cognitive engagement or learning.

The researchers present this framework in an attempt to wed the three domains of presence in order to not only understand the transactions that occur in a CMC learning environments but also to suggest a process whereby influence on any one of the domains could effect change in learning or learning outcomes.

Dewey (as cited in Garrison et al., 2000, p. 92) suggested that the educational process is two sided, one psychological and one sociological, and that neither are subordinate to the other. They concentrate their efforts within the teaching presence domain to explain causation and effects on learning. The community of inquiry is created as well as maintained in an asynchronous virtual environment primarily through text-based communication. It is crucial for the educators to understand their role and influence upon the learning environment. It is greatly differentiated from the face-to-face environs most educators are used to or have received training from within. Garrison et al. (2000) and others (Anderson & Garrison, 1995; Clark, 1994) suggest that instructional design plays a key role in effecting quality learning outcomes. Schrage (1995) suggests in a

CMC that technology "inevitably shapes the way people relate to each other" (p. 137). The understanding of the principles of instructional design is vital to the instructor teaching in a CMC environment, as they provide a means of regulation towards desirable learning outcomes. It is from this perspective of the instructor's skill, understanding of communication and learning theory that Garrison and colleagues (2000) concentrate their efforts to present the effects of teaching presence.

Recent research has shown a distinct relationship between teaching presence and cognitive presence, with social presence providing the foundation for higher-level thinking through structure, organization, and leadership associated with teaching presence. Cognitive presence emerges and is allowed to develop (Arbaugh, 2007). Garrison and Cleveland-Innes (2005) suggest course design, structure, and leadership from the instructor have a significant impact regarding cognitive presence and deep critical thinking.

By-and-large all of the empirical evidence collected and analyzed regarding presence has relied on relatively small sample populations and is largely qualitative in nature. Generalizabilty of the findings is therefore questionable and in need of further quantitative examination. From this perspective, this study is particularly timely.

CHAPTER III

Introduction

The review of literature demonstrates a reoccurring theme emphasizing the importance of instructor-to-student interaction within online learning environments (Arbaugh, 2001; Arbaugh & Duray, 2001; Jiang & Ting, 2000; McIsaac, et al., 1998; Smith, et al., 2001; Swan, 2002; Swan, et al., 2000). In particular, Shea, et al. (2001) found evidence that revealed a strong correlation between satisfaction and learning with interaction, feedback, and clear expectations. Richardson and Swan (2003) reported finding a significant correlation between instructor satisfaction and perceived learning within an online learning environment.

Garrison et al. (2000) Community of Inquiry Model has attempted to define specifically online learning environments by suggesting that online learning occurs in three interdependent domains—teaching presence, social presence, and cognitive presence. More recent studies conducted by Shea, et al. (2003) and Shea, et al. (2005) suggest that higher levels of teaching presence are linked to instructional design and organizations, facilitation of discourse, and direct instructions when measured in online learning environments. Recommendations by the authors suggest that faculty who teach in online learning environments receive additional specific training to enhance students' sense of teaching presence.

The principle intent of this study was to explore and define further the make-up and concepts of the Community of Inquiry framework, investigating specifically one core component, teaching presence, and its possible relationship with instructor satisfaction,

and exploring difference and/or similarities in structures that may exist within online and face-to-face learning environments.

Within the four domains of this study (teaching presence, instructor satisfaction, online, and face-to-face learning environments) answers to several overarching questions were sought. These questions consist of the following:

1. What relationship if any exists between student instructor satisfaction and teaching presence in online and face-to-face learning environments? For example, if students report strong instructor satisfaction, do they also then report a strong sense of teaching presence?
2. Does a strong positive or negative instructor satisfaction correlate with a strong positive or negative measure for teaching presence, or visa versa?
3. What difference, if any, does learning environment (online or face-to-face) have upon the relationship between instructor satisfaction and teaching presence?
4. What possible practical teaching insights might be revealed by the establishment of the existence of such a relationship?

As with other academic research, the goal was to add to the body of existing research in regards to instructor satisfaction and teaching presence in order to gain: deeper insight and understand, practical knowledge, and principles while defining the similarities and differences of teaching presence and instructor satisfaction. Another goal was to confirm or deny whether similar factor structures established in Shea, et al. (2005) research on teaching presence did or did not exist in both online and face-to-face learning

environments.

Purpose of the Study

This study employed two previously used research instruments: a course evaluation examining instructor satisfaction and a survey designed to measure teaching presence. The first instrument (CIEQ) to be used was a course evaluation. This particular instrument asks several specific questions regarding students' perceptions of instructor satisfaction. The purpose of employing this instrument was to determine the levels of satisfaction students relate toward their instructor within both online and face-to-face learning environments. The second instrument (Instrument 2 - Online Teaching and Learning Questionnaire [TP]) was designed to determine the levels of student related teaching presence from the same online and face-to-face learning environments. Prior research conducted by Shea, et al. (2003) and Shea, et al. (2005) examining teaching presence in online learning helped to define and further aspects of Garrison et al's. (2000) previously postulated Community of Inquiry framework. Following much of Shea et al's. (2003) research methodology, this study attempted to build upon earlier findings regarding teaching presence in online learning environments while extending the research to the exploration of face-to-face learning environments. Also, this study examined the relationship between independent variables teaching presence and instructor satisfaction. Data analysis assisted in determining relationships and differences between instructor satisfaction, teaching presence, online and face-to-face learning environments. This study attempted to extend to the body of knowledge with regards toward learning environment

differences (online and face-to-face), instructor preparedness and facilitation, and the Community of Inquiry framework, specifically teaching presence.

Central Research Question

Is there a relationship between teaching presence and instructor satisfaction as reported by online and face-to-face students?

What role does the learning modality (online or face-to-face) have on the instructor satisfaction and teaching presence and the relationship between them?

Research Questions

1. Does the teaching presence scale "Online Teaching and Learning Questionnaire" (developed by Shea, et al. [2005]) exhibit the same factor structures for teaching presence as exhibited in Shea, et al. (2005) findings when used with both online and face-to-face undergraduate college students?
2. What is the relationship between student perceptions of teaching presence and instructor satisfaction?

    2a. Is this relationship similar when students participate in either online or face-to-face versions of the course?
3. Do mean student ratings of instructor satisfaction and teaching presence differ when instruction is delivered either via online video or face-to-face lecture?

Subjects

The sample populations used in this study were defined as a nonprobability convenience samples. The sampling for this examination was not done at random and was the easiest and most readily available to the researcher at the time of data collection. In nonprobability sampling, the degree to which the sample differs from the population remains unknown. Therefore, convenience sampling does not represent the entire populations so it is considered biased.

This study consisted of a total sample frame size of approximately 698 enrolled students from two sample populations consisting of online distance education learners and face-to-face traditional learners who were enrolled in undergraduate Food Science course taught by the same instructor at a Midwestern university, at a nearby satellite campus, and through the University's online program during the Fall, 2008 semester. Five hundred four students were enrolled online and received course materials via a CMS. A total of 170 students were enrolled in two sections of face-to-face lecture, one section at the main campus and another section at the satellite campus (See CHAPTER IV: Demographic Analysis for results). All students attending face-to-face lectures received the same course materials via the same CMS as the online students.

Conditions

This study compared student-recorded data regarding instructor satisfaction and teaching presence as expressed on two survey instruments in an introductory Food Science course during the Fall, 2008 semester. The course was taught in a traditional

face-to-face manner at the institution itself, one satellite campus, and through the University's online program. There were a total of six hundred and ninety-eight students enrolled in this course that were used as the sample population.

The two populations were taught from lectures and other supplemental materials provided by one instructor and distributed by a single CMS systems. The originating instructor lead lectures delivered in two different lecture hall locations on the two campuses, the main University campus and the satellite campus at several varying time periods during each week. The instructor's face-to-face lecture presentations given at the main campus were videotaped and processed the same calendar day for electronic distribution to the appropriate course domains designated within the singular CMS for enrolled online students.

The process of video recording and electronically distributing materials from the University's CMS consisted of a staff instructional technologist videotaping lecture content for the duration of the scheduled face-to-face class period using a single manned video camera placed at the back of the room. The camera operator followed the instructor's unrestricted movements as he taught during a traditional lecture hall session. This technologist, once the live lecture was completed, subsequently processes the videotaped material for electronic distribution within the online students' CMS domains. This process was done during each main campus lecture. Students viewing the materials online all received the content on the same calendar day, typically within a six hours timeframe from the originating lecture.

Data Collection

Two instruments (CIEQ and TP) were administered to all students (face-to-face and online) during the final examination for the course. Due to the large enrollment size of this course and limited facilities for large examinations, all students (face-to-face and online) were required to come to one of the scheduled examinations as part of their final examination procedure. Students were given opportunities to attend any one of the four-scheduled final examination periods held at each the main and satellite campus (two at each campus). Prior to the final examination, students were given oral instructions and notified of their voluntary participation in this research and right to refusal. Students were instructed to hand in both their final examination and the evaluation materials at the same, time just prior to exiting the examination facility. A total of 574 packets were distributed over the four examination periods; all packets were subsequently returned with no missing packets reported. After the data collection was completed, each packet was examined for response accuracy and completion.

Each student attending the final examination periods received a survey packet containing; general instructions, study descriptions and intent, IRB approval notification, instrument 1, and instrument 2 with a matching Scantron® response sheet (See APPENDIX C, D, and E). Data collection for both face-to-face and online students with these two instruments took place as a one-time event at the end of the course. Randomization of subjects was not possible due to the geographic dispersion of students and limitations of adequate available examination facilities at both campus locations at the time of collection. No reminders or alert notifications were delivered to students at a

later time. Students not taking their final examination did not have an opportunity to complete this measurement.

Research Instrument Description

Two different survey instruments were used in the data collection. CIEQ was a course evaluation. This particular evaluation is the Aleamoni (1978) CIEQ a twenty-nine item instrument used by several departments at this Midwestern university for many years to give general course and instructor feedback. Instructor satisfaction is but one of five sub-categories (General Course Attitude, Method of Instruction, Course Content, Interest and Attention, and Instructor) gathered on CIEQ. Only the five instructor satisfaction items were used in analysis with no other sub-category data used in this examination. The CIEQ evaluation is designed to measure both faculty teaching and course performance. Validity for this particular instrument has not been established by its author; however, the instrument has been in use by the University's College of Agricultural Sciences and Natural Resources for well over ten years.

The second instrument, Online Teaching and Learning Questionnaire consisted of twenty-seven items measuring teaching presence within three sub-categories, Instructional Design and Organization, Facilitating Discourse, and Direct Instruction. This instrument was initially developed with guidance from Anderson, one of the originators of the Community of Inquiry Model and implemented by Shea, et al. at the New York State University at Stony Brook in 2005. The instrument is designed to measure student feedback regarding student-teacher interaction in online learning

environments.

Course/Instructor Evaluation Questionnaire (CIEQ)

CIEQ was a twenty-nine item course evaluation overprinted on a single Scantron® response form known as the Course/Instructor Evaluation Questionnaire developed by Lawrence M. Aleamoni (1978) (See APPENDIX C). The CIEQ is a widely used course evaluation and assessment instrument that measures five sub-scales, General Course Attitude, Method of Instruction, Course Content, Interest and Attention, and instructor satisfaction. The CIEQ has been used by this Food Science course's academic department and college as a means of instructor and course evaluation for well over ten years. Upon the author's review of the instrument, it was deemed that valuable and relevant information could be correlated with the Community of Inquiry framework, specifically the instructor centered and performance related teaching presence component. Therefore, for this examination, only the CIEQ's instructor satisfaction sub-scale was examined. This sub-scale was singled out for examination because it provides the course instructor with the most direct feedback regarding students' perceptions of the instructor's manner, personality, attitude, and effectiveness in the classroom. This sub-scale as authored was intended to provide to instructors the most direct means of specific recommendations for teaching skill set improvements and discourse and student facilitation (See Table 3.1.). Like all other sub-scale items, each of the five instructor satisfaction items was dispersed throughout the evaluation form.

Table 3.1
CIEQ Instructor Satisfaction Measurement Items and Response Interpretations

Instructor satisfaction measurement items	Response interpretations
Item 1. The instructor seemed to be interested in students as individuals	In responding to this item students are indicating that the instructor (a) knew their names, (b) was willing to help them with their problems, (c) knew who they were outside of the classroom, (d) recognized students having problems, (e) seemed to respect student opinions, and (f) did not embarrass them by making them feel like dunces for asking certain questions or giving certain answers.
Item 2. The instructor did NOT synthesize, integrate, or summarize effectively	In responding to this item students are indicating that the instructor (a) did not repeat material at appropriate and necessary intervals, (b) was not able to put together the various components of the learning experience so that the students could make sense out of it, and (c) only presented the various components of the learning experience and expected the students to put them together in a meaningful manner.
Item 3. The instructor encouraged development of new viewpoints and appreciations	In responding to this item students are indicating that the instructor (a) encouraged them to go beyond what took place in the classroom by recognizing their efforts and (b) was open and receptive to their opinions in the classroom.
Item 4. The instructor demonstrated a thorough knowledge of the subject matter.	In responding to this item students are indicating that the instructor (a) exhibited flexibility in his/her presentation, (b) used different methods of presenting materials, (c) did not read from a book to the class, (d) knew the sources, references, and location of additional learning materials, (e) was able to answer their questions, (f) was able to conduct an effective lecture, (g) gave clear-cut answers to their questions and did not try to "bluff" them, (h) was able to present different interpretations of the material, and (i) did not hesitate to admit lack of knowledge in particular areas.

Item 5. The instructor seemed to consider teaching as a chore or routine activity.	In responding to this item students are indicating that the instructor (a) exhibited a "here-we-go-again" attitude, (b) did not exhibit much enthusiasm toward the material, (c) was insensitive towards students' interests as they relate to class, (d) tended to treat the classroom session more like a "bull session" rather than as a learning experience, and (e) wore a bored or uninterested expression in the classroom.

Note. CIEQ response interpretations for each of the five instructor satisfaction measurement items, authored by Aleamoni (1978).

CIEQ reliability

Aleamoni (1978) has stated that the internal consistency reliability coefficients for the five sub-scales ranged from 0.80 to 0.98 (Cronbach's coefficient alpha). No specific reliability rating for the instructor satisfaction measure had been stated.

TP

TP was a twenty-seven item survey deployed using a questionnaire sheet and a Scantron® response form designed to measure students' perceptions of teaching presence (See APPENDIX D). This instrument was developed by Shea, et al. (2005) with consult from Anderson, one of the originating authors of the Community of Inquiry framework. The instrument has been used in a previous study conducted by Shea, et al. in 2005. The instrument consists of a total of twenty-seven questions.

Anderson et al. (2001) refer to teaching presence as being comprised of three core components; Instructional Design and Organization, Facilitating Discourse, and Direct Instruction. Each of these scales was represented with a series of question within TP. The scale assessing instructional design and organization has six items measuring the setting of curriculum, designing methods, establishing time parameters, utilizing the medium

effectively, and establishing netiquette. The facilitation of discourse section contained six items assessing the professor's proficiency in identifying areas of agreement and disagreement; seeking to reach consensus, reinforcing student contributions, setting climate for learning, drawing in participants, prompting discussion, and assessing the efficacy of the process. The direct-instruction section has four items assessing the professor's proficiency in presenting content and questions, focusing the discussion on specific issues, diagnosing misperceptions, and injecting knowledge from diverse sources. The rating of the teaching presence components was on a five-point Likert-type scale, from *strongly disagre*e = 1, *disagree* = 2, *neutral* = 3, *agree* = 4, to *strongly agree* = 5 (See Table 3.2.).

Table 3.2
Teaching Presence Measurement Items and Response Interpretations

Teaching presence sub-categories	Question items
Instructional design and organization	
Setting curriculum	Overall, the instructor for this course clearly communicated important course outcomes (for example, provided documentation on course goals). Overall, the instructor for this course clearly communicated important course topics (for example, provided a clear and accurate course overview).
Designing methods	Overall, the instructor for this course provided clear instructions on how to participate in course learning activities (for example, provided clear instructions on how to complete course assignments successfully).
Establishing time parameters	Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped students keep pace with the course (for example, provided a clear and accurate course schedule, due dates and more).
Utilizing the medium effectively	Overall, the instructor for this course helped students take advantage of the online environment to assist their learning (for example, provided clear instructions on how to participate in online discussion forums).

Establishing netiquette	Overall, the instructor for this course helped students to understand and practice the kinds of behaviors acceptable in online learning environments (for example, provided documentation on netiquette, i.e., polite forms of online interaction).
Facilitating discourse	
Identifying areas of agreement/ disagreement	Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics in ways that assisted students to learn.
Seeking to reach consensus	Overall, the instructor for this course was helpful in guiding the class towards understanding course topics in a way that assisted students to learn.
Reinforcing student contributions	Overall, the instructor in this course acknowledged student participation in the course (for example, replied in a positive, encouraging manner to student submissions).
Setting climate for learning	Overall, the instructor for this course encouraged students to explore new concepts in this course (for example, encouraged "thinking out loud" or the exploration of new ideas).
Drawing in participants, prompting discussion	Overall, the instructor for this course helped keep students engaged and participating in productive dialogue.
Assessing the efficacy of the process	Overall, the instructor for this course helped keep the participants on task in a way that assisted my learning.

Direct Instruction	
Presenting content/questions	Overall, the instructor for this course presented content or questions that helped me learn.
Focusing the discussion on specific issues	Overall, the instructor for this course focused discussion on relevant issues in a way that helped me learn.
Diagnosing misconceptions	Overall, the instructor for this course helped me to revise my thinking (for example, correct misunderstandings) in a way that assisted my learning.
Injecting knowledge from diverse sources	Overall, the instructor for this course provided useful information from a variety of sources that assisted my learning (for example, references to articles, textbooks, personal experiences, or links to relevant external websites).

Data Analysis

The quantitative data was edited for completeness, consistency, and duplication, and then electronically coded and organized into comma delimited files. These were then analyzed using SPSS (Statistical Package for Social Sciences) data analysis software version seventeen.

A quantitative research design method was used using descriptive statistical analysis. Statistical power and effect size was calculated to understand sample size and its relationship to power (Newton & Rudestam, 1999).

Statistical Analysis

The statistical analysis for this study was done in four statistical phases. Each phase was viewed as progressive and as matching the research questions proposed. A variety of statistical analysis measures were used to determine the various outcomes from each step. These are as follows:

Phase 1: Confirm Teaching Presence Factors

Research Question:

Does the teaching presence scale "Online Teaching and Learning Questionnaire" (developed by Shea, et al. [2005]) exhibit the same factor structures for teaching presence as exhibited in Shea, et al. (2005) findings when used with both online and face-to-face undergraduate college students (See Figure 3.1.)?

Hypothesis:

Null: The teaching presence scale developed by Shea, et al. (2005) will NOT exhibit the same factor structure as present in Shea, et al. (2005).

Alternative: The teaching presence scale developed by Shea, et al. (2005) WILL exhibit the same factor structure as present in Shea, et al. (2005).

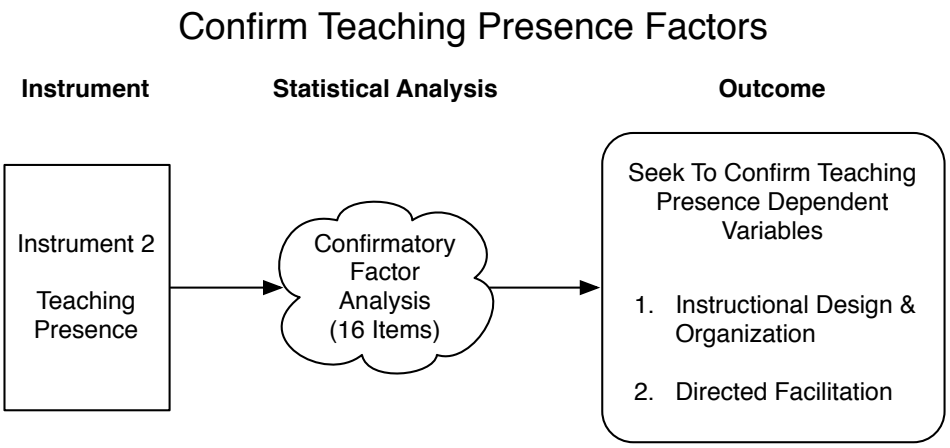

Figure 3.1. Research question 1.

A Confirmatory Factor Analysis (CFA) was used as a first step to assess the proposed Community of Inquiry Model component of teaching presence. TP, a twenty-seven item survey designed to measure and investigate teaching presence was previously used by Shea, et al. (2005) and was employed in this study for *goodness-of-fit*. It was anticipated that similar *factor loadings* would occur on nearly all of the same items as reported in Shea, et al. (2005) from data collected in this study.

Understanding CFAs

A CFA is a special case of structural equation model (SEM), it is a statistical technique used to study relationships between a set of observed variables and a set of latent continuous variables (Bollen, 1989). CFAs are instrumental in allowing researchers to test hypothesis that a relationship between observed variables and their underlying latent constructs exists. With a CFA it is possible to place meaningful constraints on the factor model, such as setting the effect of one latent variable onto a subset of the observed variables (See Figure 3.3. for an illustration of this concept.). A CFA has the advantage of allowing for hypothesis testing with regard to a particular factor structure. This is the type

of statistical analysis that was chosen for this research question as it was the most appropriate for testing Shea, et al.'s (2005) teaching presence instrument and the two sub-scale constructs for model goodness-of-fit.

Commonly CFA models are displayed as path diagrams in which rectangles represent observed variables and the ovals represent the latent variables. Figure 3.3 has one latent variable that is manifested by six observed variables represented as rectangles. Arrows are used to show implied direction of the assumed causal influence. Latent variables "cause" the observed variables as shown by the single headed arrows pointing away from the circles towards the manifested variables. The ovals represent latent variables are also known as *factors*. A factor can point to more than one observed variables. For example, in Figure 3.3 Latent Variable 1 causes six observed variables. Factor loadings are values represented along the arrow lines and refer to the regression slope. The squared *factor loadings* represent the proportion of variance in the observed variable that is explained by the latent variable (Brown, 2006).

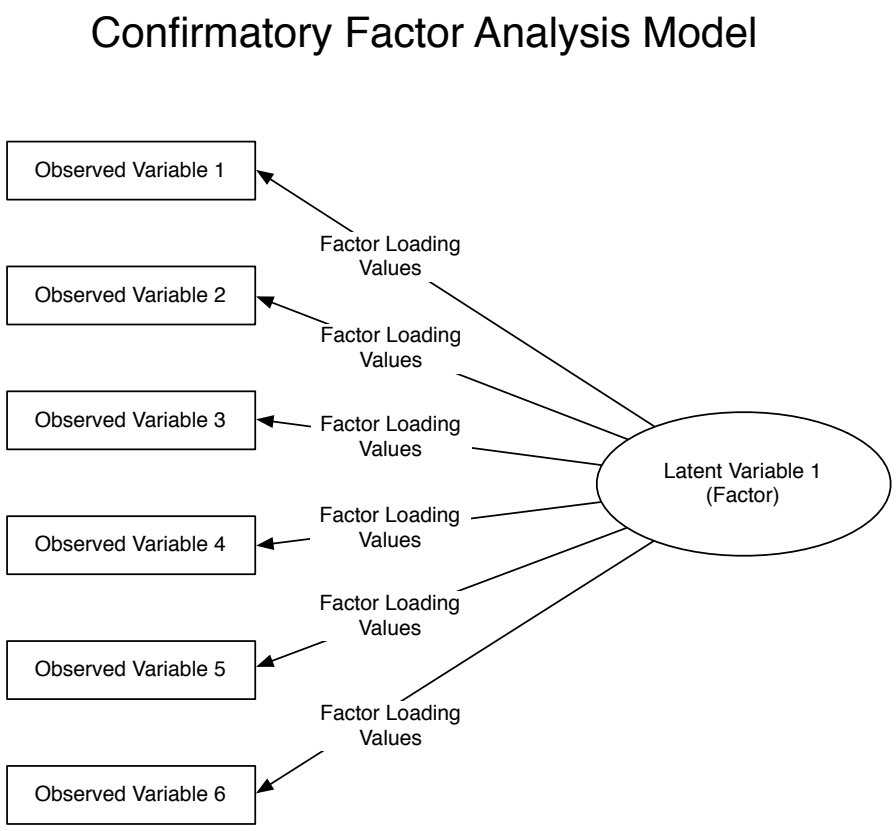

Figure 3.2. Confirmatory Factor Analysis path.

According to Albright and Park (2008) an essential step in any CFA investigation is to establish whether the specified model is identified (See Figure 3.3 CFA Model factor path diagram.). This is accomplished in CFAs when all unknown parameters can be rewritten in terms of their variance's and covariance's of the x variables. Without establishing some constraints a CFA is not identified. This is because latent variables are unobserved and hence their scales are unknown. Therefore, it is necessary to set the metric of the latent variables in some way. One of the most common constraints used in CFAs is to set either the variance of the latent variables or one of its factor loadings to one. In this examination the sixteen latent variables were set to 1.00.

The meaning of the factor loading magnitudes varies by research context. Interpretation of factor loading is often an arbitrary exercise. A common practice in social science research is to establish a minimum cut-off value for a factor loading at 0.30 or slightly less at 0.35. Another arbitrary rule-of-thumb terms loadings as "weak" if less than 0.4, "strong" if more than 0.6, and otherwise as "moderate." There is no one set standard for interpretation. Generally for Likert-scales instruments a 0.60 is considered "high" (Hu & Bentler, 1999).

Many statistical tests exist for assessing how well hypothesized models match observed data. Chi-square (χ^2) is commonly used as a goodness-of-fit measure to determine overall model fit. A large Chi-square and rejection of the null hypothesis is interpreted as meaning the model estimates do not sufficiently reproduce sample covariance, thus the model does not fit the data well. Conversely, a small Chi-square value and failure to reject the null hypothesis is a sign of a good model fit (Albright & Park, 2008). However, Jöreskog (1969) revealed that the Chi-square measure used as a fit indexes alone is not without problems. Therefore, additional measures are often employed, such as *Root Mean Square of Approximation* (RMSEA), *Comparative Fit Index* (CFI), and *Tucker-Lewis Index* (TLI) each with their own advantages and disadvantages in their specificity to discriminate the data in more restrictive or particular manner. Therefore, a goodness-of-fit measure is often and typically reported with several fit indexes. This research used χ^2, RMSEA, CFI, and TLI measures for all confirmatory factor analysis performed.

Phase 2: Relationship Between Measures (Both Modalities)

Research Question:

What is the relationship between student perceptions of teaching presence and instructor satisfaction? (see Figure 3.4)?

Hypothesis:

Null: There will NOT be a relationship between student perceptions of teaching presence and instructor satisfaction.

Alternative: There WILL be a relationship between student perceptions of teaching presence and instructor satisfaction.

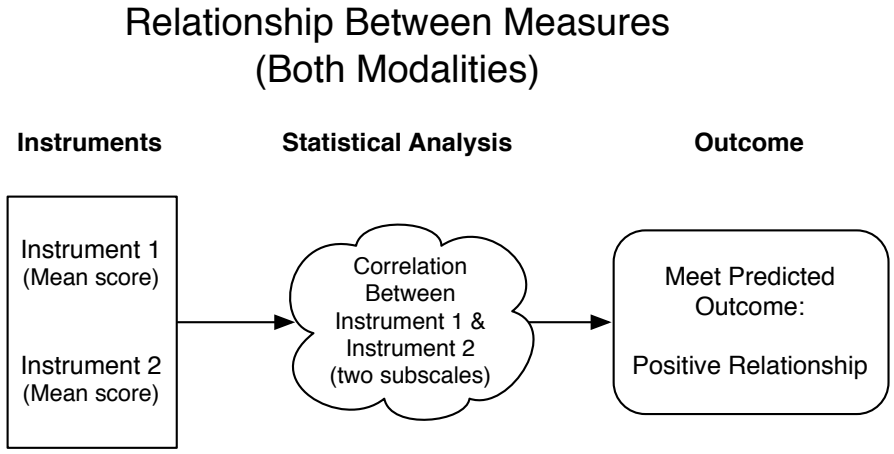

Figure 3.3. Research question 2.

Using mean scores from both CIEQ and TP the establishment of whether a corollary relationship exists between independent variables, online learning and face-to-face learning, was explored using Pearson's correlation analysis. A positive relationship would indicate that independence between variables is less than random. A Pearson (*r*)

correlation measure was used to measure the degree and direction of linear relationship between the two independent variables.

A Pearson's *r* measure was used to describe the strength of a linear relationship between two variables. These two variables typically are labeled X (predictor) and Y. A positive correlation indicates that as X increases, scores on Y tend to decrease. Conversely the reverse is true for a negative correlation.

The magnitude of the Pearson's *r* is measured by the strength of the linear association of the X and Y variables. Values of *r* close to 0 indicate no linear association, while a value of $r = +1.00$ indicates a perfect positive linear association. Again, the converse of $r = -1.00$ indicates a perfect negative linear association.

Phase 3: Relationship Between Modalities (Both Instruments)

Research Question:

Is this relationship similar when students participate in either online or face-to-face versions of the course (see Figure 3.5)?

Hypothesis:

Null: The relationship between online and face-to-face students IS the same between teaching presence and instructor satisfaction.

Alternative: The relationship between online and face-to-face students is NOT the same between teaching presence and instructor satisfaction.

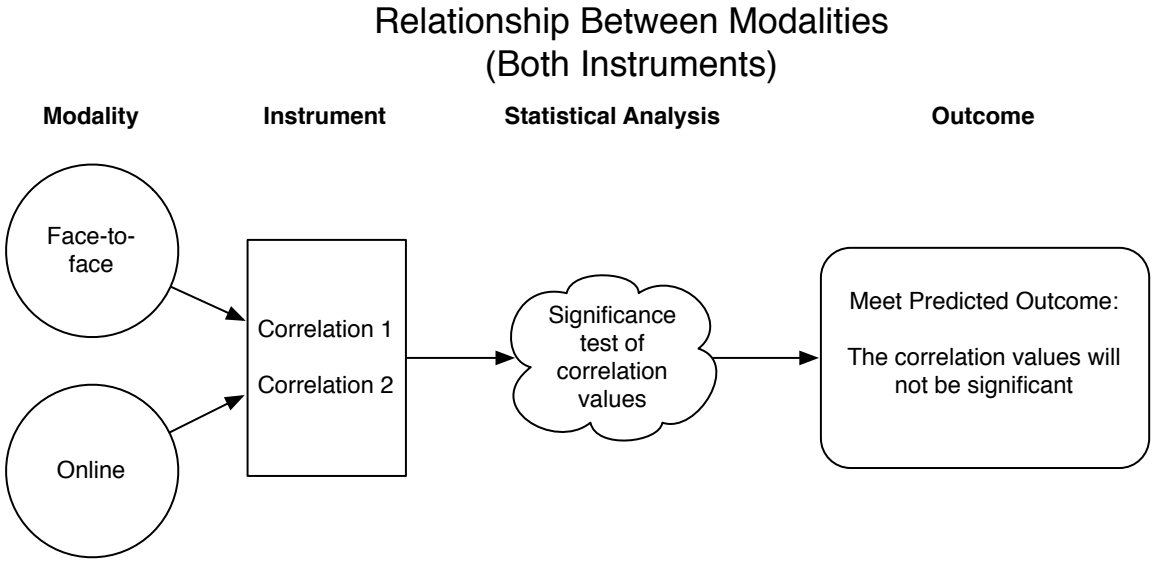

Figure 3.4. Research question 2a.

As a sub-analysis of Phase 2, looking only at the mean scores for the independent variables online and face-to-face learning across both CIEQ and TP, the desire was to statistically explore whether a relationship existed between the two instruments of

measure for this sample population using a Pearson correlation analysis. A positive relationship would indicate that similarities in mean scores for each instrument of measure were less than random. A Pearson correlation measure was used to measure the degree and direction of linear relationship between the two dependent variables (see Tables 3.3).

Table 3.3
Modality Correlations

Independent variables	Dependent variables
Mode of Instruction	Instructor satisfaction (CIEQ) Teaching presence (TP)

Phase 4: Difference Between Groups Within Measures

Research Question:

Do mean student ratings of instructor satisfaction and teaching presence differ when instruction is delivered either via online video or face-to-face lecture (see Figure 3.6)?

Hypothesis:

Null: There is NOT a difference between online and face-to-face and instructor satisfaction and teaching presence and between online and face-to-face students rating of instructor satisfaction and teaching presence.

Alternative: There IS a difference between online and face-to-face and instructor satisfaction and teaching presence and between online and face-to-face students rating of instructor satisfaction and teaching presence.

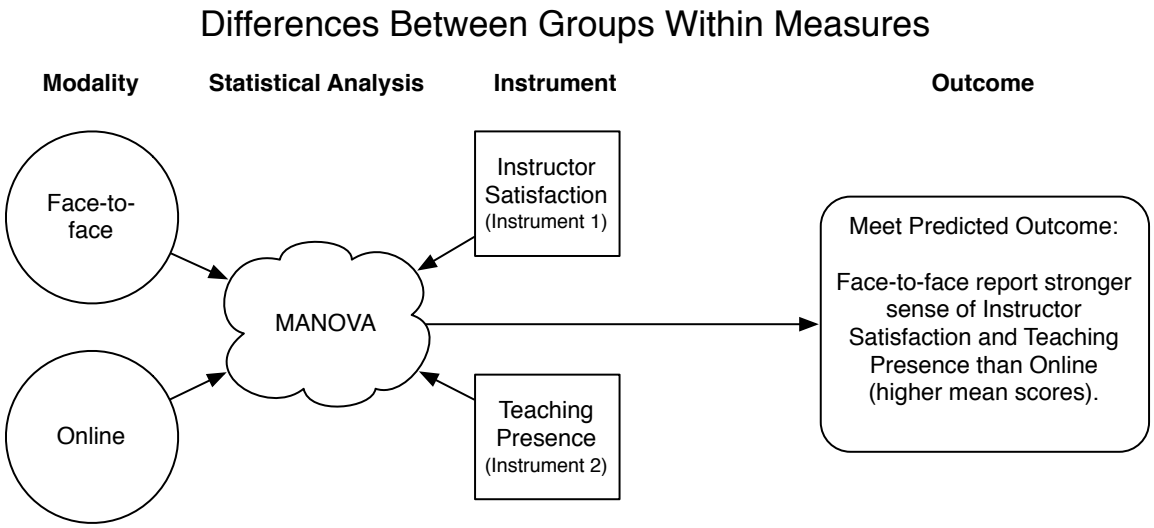

Figure 3.5. Research question 3.

A MANOVA statistic was used to explore for the potential of interaction between the independent and dependent variables. A MANOVA statistic was selected due to the complexity of the question being asked and its ability to be able to take into account multiple independent and dependent variables within the same model. MANOVA provides the researcher an opportunity to learn more about the data by investigating variables in combination rather than individually. MANOVA analysis is commonly used in studies investigating mean differences as researchers are often interested in evaluating mean differences on several criterion variables, as opposed to a single criterion variable. Additionally, MANOVA analysis can be used to look at relationships among variables rather than looking at each variable in isolation (Bray & Maxwell, 1985) (see Figure 3.7).

In correlation tests it is often common for the examinations to uncover a relationship between dependent variables where they existence. Thus, as Gravetter and Wallnau, (2006) statistical methods authors aptly point out, "One of the most common errors in interpreting correlations is to assume that a correlation necessarily implies a cause-and-effect relationship between two variables" (p. 516). Often this common error is primarily due to the high family-wise error rates found with correlation research where the odds are fairly high of finding something significant existing simply because chance rates rise with repeated use of the same sample data. In this case a found relationship can be considered suspect. Adding a MANOVA analysis provides another means of a testing for significance. MANOVA procedures provide an additional measure of analysis testing for group differences in some multi-dimensional space where each dimension is defined by linear combinations of the original set of dependent variables. This helps the researcher to tease out additional information from the data potentially not revealed in the correlation results, while at the same time adding an extra measure of analysis to any relationship findings.

In MANOVA operations, if the within-subjects variance is smaller than the between-subjects variance, it means that the independent variable has had a significant effect on the dependent variables. MANOVA modeling occurs in a three-step process. A MANOVA can handle multiple dependent variables by combining them in a linear manner to produce a combination or summed dependent variable. An illustration of this can be visualized in Figure 4.21, as illustrated by the y_1 and y_2 variables. This step was performed first. Next, an analysis of variance (ANOVA) was performed on the newly

developed summed dependent variables in order to tease out levels of interaction. After the ANOVA calculation, the independent variables relevant to each main effect (instructor satisfaction and teaching presence in this case) are weighed to give each priority in the subsequent calculations to be performed. In the final step of the MANOVA statistic, the main effects of the independent variables and of the interactions are examined with all else held constant. This effect on each of the independent variables is tested separately. A number of indicators of significance for multivariate measures can be applied. For this investigation the Wilks' lambda measure is reported. It should be noted that a statistical main effect of an independent variable implies that the independent variable groups are significantly different in terms of their score on the dependent variable, but this does not establish that the independent variable has caused the changes in the dependent variable.

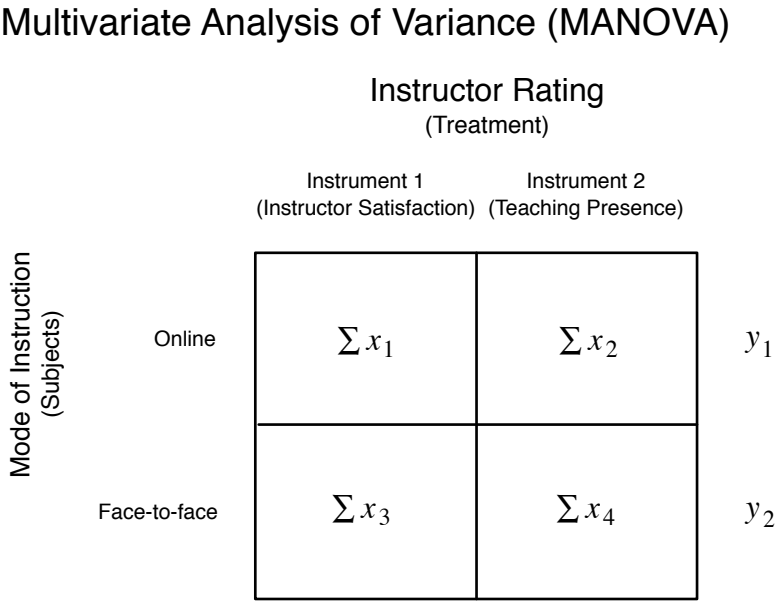

Figure 3.6. Multivariate Analysis of Variance (MANOVA).

If significant interactions are found in the MANOVA, smaller Analysis of Variance (ANOVA) models are subsequently run using only the independent variables that have been determined significant in the initial MANOVA, these statistics are then used in a post hoc analysis. If no significance is found in the MANOVA, no further analyses are performed. Refer to Table 3.4 for a summary of the variables for the MANOVA.

Table 3.4
Summary of Variables for Multivariate Analysis of Variance (MANOVA)

Independent variables	Dependent variables
Mode of Instruction	Instructor satisfaction (CIEQ) Teaching presence (TP)

In this research differences between modalities were analyzed. This was done by looking for the existence of an interaction between two within subject variables. In this case the difference within both online student's responses and face-to-face student responses when comparing mean outcomes for CIEQ, TP, and Mode of Instruction. The use of a MANOVA analysis was intended to reveal which group or modality (online or face-to-face) is generally most satisfied with their instructor and reveals the highest response toward teaching presence, and if the two are dependent upon one another.

Ethical Considerations

According to McNamara (1994) five primary concerns should be considered when conducting survey research. These five guideline items addressed in the following paragraph deal with voluntary participation, no harm to respondents, anonymity and confidentiality, identifying purpose and sponsor, and analysis and reporting.

Institutional Review Board (IRB) approval was sought from the University of Nebraska-Lincoln where the study was conducted. All participants were given the opportunity to take either survey, CIEQ and TP, or neither, thus they were not in any way mandated to participate in this data collection or subsequent findings in any way. Voluntary consent was sought from the presiding instructor for permission to distribute and attain information for TP. CIEQ consisted of the course evaluation which was distributed as a course of measure at a large majority of the main campus's, satellite campus's, and extended education division's courses as a means of providing instructor feedback. Appropriate permission was sought to retrieve and analyze data collected from this instrument for this study. All participants were made aware that all data collected for this study would reside on a single computer and that the findings might be published, distributed, and delivered in academic journals and/or conferences (see APPENDIX C).

CHAPTER IV

Introduction

This study's intent was to explore and to define further the make-up and concepts of the Community of Inquiry framework, investigating specifically one core component, teaching presence, and its possible relationship with instructor satisfaction. Likewise, it was intended to explore differences and/or similarities in previously posited structures for teaching presence established by Shea et al. (2005) that may exist within online and face-to-face learning environments.

This study was designed to answer the following three questions that guided the research and maintained its direction:

1. Does the teaching presence scale "Online Teaching and Learning Questionnaire" developed by Shea et al. (2005) exhibit the same factor structures for teaching presence as exhibited in Shea et al.'s (2005) findings when used with both online and face-to-face undergraduate college students?
2. What is the relationship between student perceptions of teaching presence and instructor satisfaction?
    2a. Is this relationship similar when students participate in either online or face-to-face versions of the course?
3. Do mean student ratings of instructor satisfaction and teaching presence differ when instruction is delivered either via online video or face-to-face lecture?

This chapter will first discuss the overall findings for reliability of the two instruments, demographic data and students' final total earned points analysis. This

information will next be followed by the four phases of statistical analyses conducted with respect to each of the research questions posited (see Figures 4.1). Explanation of the analysis process for each question and the resulting statistical data will be reported.

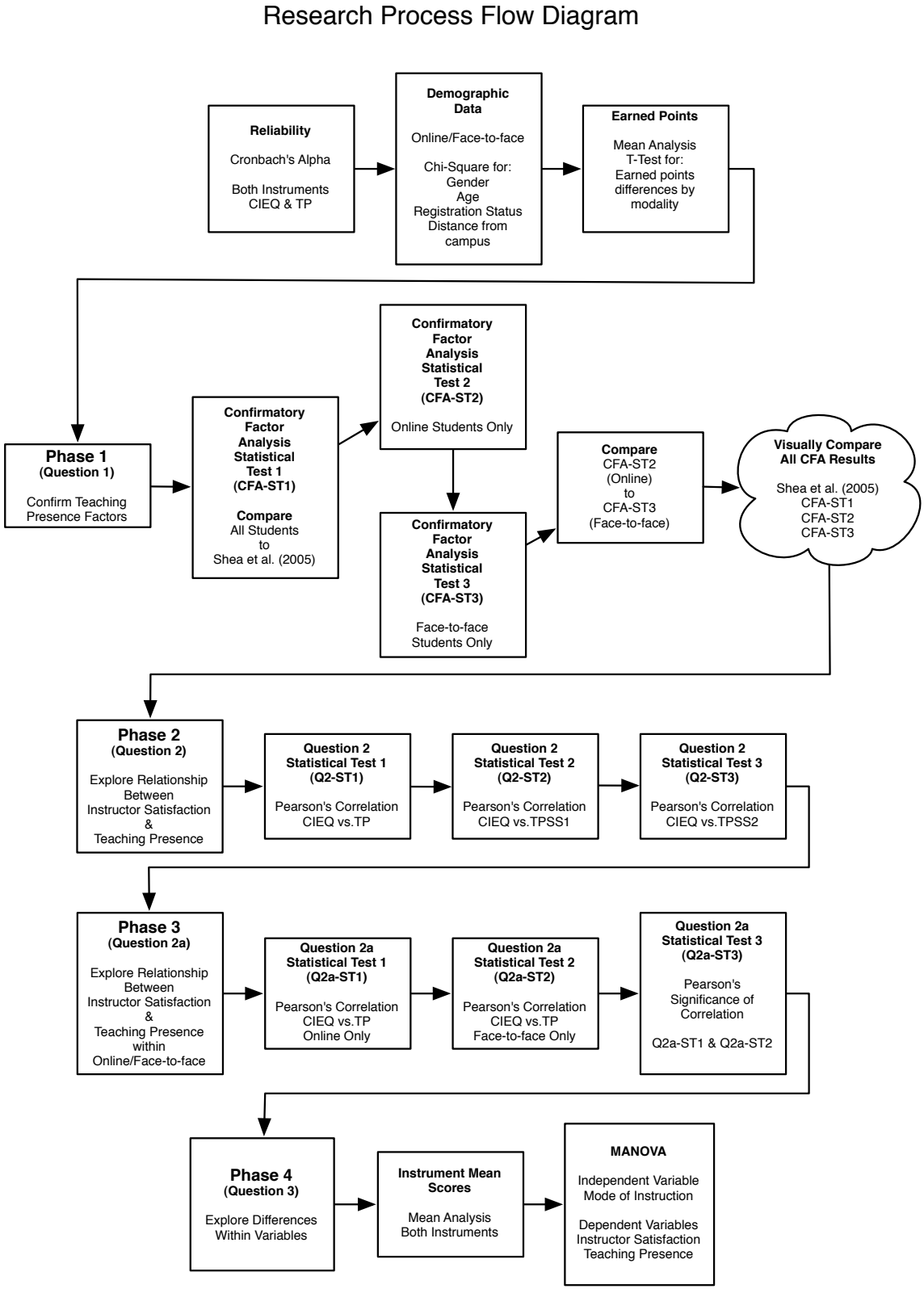

Figure 4.1. Research Process Flow.

Instrument's Reliability Results

Reliability tests were conducted on both instruments, the five-item instructor satisfaction measure (Course/Instructor Evaluation Questionnaire [CIEQ]) and the sixteen-item teacher presence measure (Online Teaching and Learning Questionnaire [TP]) to examine each measure's internal consistency. Reliability tests are common in survey-based examinations and are important in determining consistency of a measure. Alpha values at or above 0.70 typically are considered acceptable reliability coefficient values (Nunnally, 1978). TP's two comprised sub-scales of instructional design and organization (TPSS1) and directed facilitation (TPSS2) are represented for comparison along with reliability values from similar prior research conducted by Shea et al. (2005). A subsequent discussion regarding Shea et al.'s (2005) research and additional results will also be presented at a later point in this chapter. All Alpha coefficient results from both measures used here and those reported in Shea et al. (2005) are represented in Table 4.1.

Table 4.1
CIEQ and TP Reported Reliability Coefficients

Instruments	Cronbach's coefficient (*Alpha*)	
	Shea et al. (2005)	Bentz (2009)
CIEQ (five items)		0.61
TP (sixteen items)	0.97	0.91
TPSS1: Instructional Design and Organization	0.94	0.79
TPSS2: Directed Facilitation	0.97	0.87

Note. The Shea et al. (2005) TP coefficient results are provided for comparison.

Demographic Data Findings

To better understand this sample population categorical demographic data were collected on all student participants. This data as reported includes percentages for all online/face-to-face learning environment, gender, age, registration status, distance from campus, and why students were taking the course online and frequencies for age, registration status, and distance from campus. All results were computed for the total population combined and both online and face-to-face sample populations where applicable. Overall percentages are reported for each possible response along with pie chart diagrams to illustrate all demographic data collected (see Figures 4.2 to 4.7).

Follow up Chi-squared statistical analyses were conducted on the gender, age, registration status, and distance from campus demographic data looking for an

association between mode of instruction (online or face-to-face). The results of these tests are reported with each demographic item.

Instructional Modality: Online/Face-to-face

Of the 561 participants, 410 (73.08%) reported taking the course online and 151 (26.91%) reported taking the course face-to-face (see Figure 4.2).

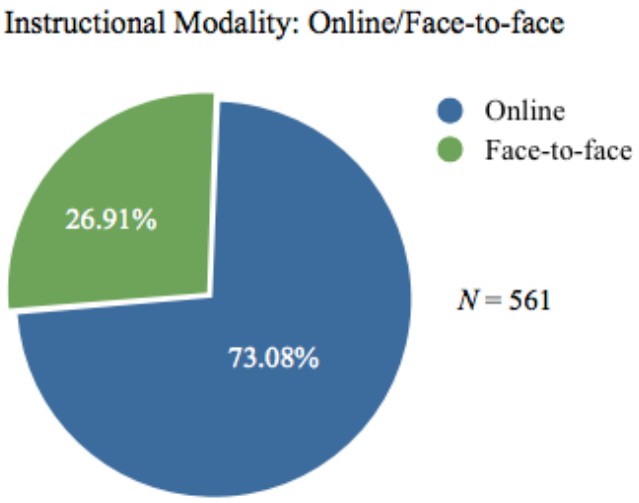

Figure 4.2. Demographic results: Online/Face-to-face.

Gender

As to gender, 211 students (37.61%) reported being male, while 350 (62.38%) reported being female (see Figure 4.3). A total frequency and percentage break down by gender is represented in Figure 4.3.

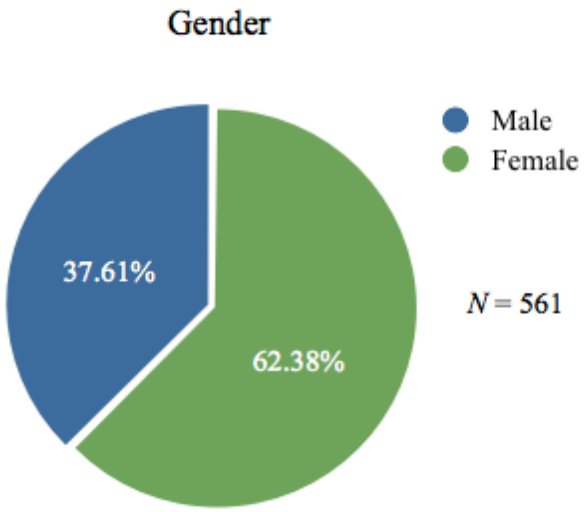

Figure 4.3. Demographic results: Gender.

A Chi-square (χ^2) test showed that gender responses had no significant association with the modality by which the students received instruction, $\chi^2(1, N = 561) = 0.683$, n.s.

Age

Students were asked about their age. The responses ranged from 18 to 64 in five categories: 516 (92.14%) students reported being between 18-24 years old, 33 (5.89%) students reported being between 25 to 34 years old, 10 (1.78%) students reported being between 35 to 44 years old, 1 (0.17%) student reported being between 45 to 54 years old, and no students reported being between 55 to 64 years old (see Figure 4.4 and Table 4.2).

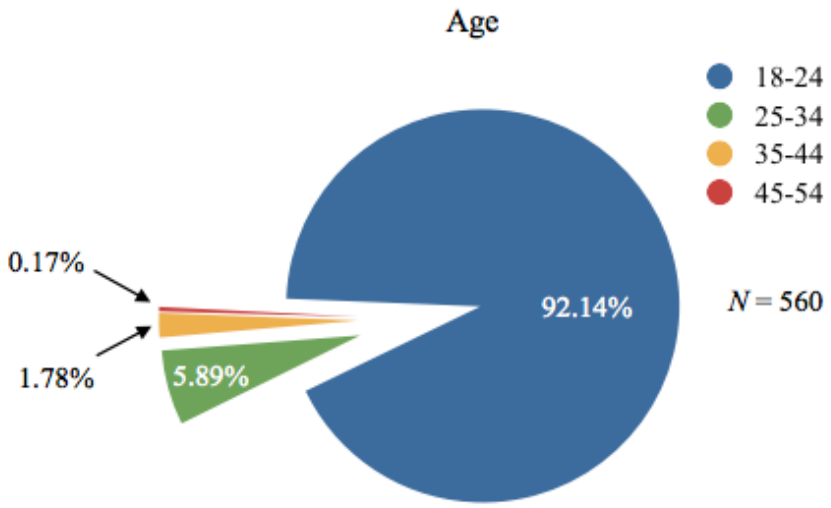

Figure 4.4. Demographic results: Age.

Table 4.2
Age (N = 560)

Responses	Online $N = 410$		Face-to-face $N = 150$	
	f	%	*f*	%
18-24	376	91.70	140	93.4
25-34	25	6.09	8	5.3
35-44	8	1.95	2	1.3
45-54	1	0.24		

A Chi-square (χ^2) test showed that age responses had no significant association with the modality by which the students received instruction, $\chi^2(3, N = 560) = 0.741$, n.s.

Registration status

Registration status: 521 (93.36%) students reported attending school full-time and 37 (6.63%) reported attending school part-time (see Figure 4.5 and Table 4.3).

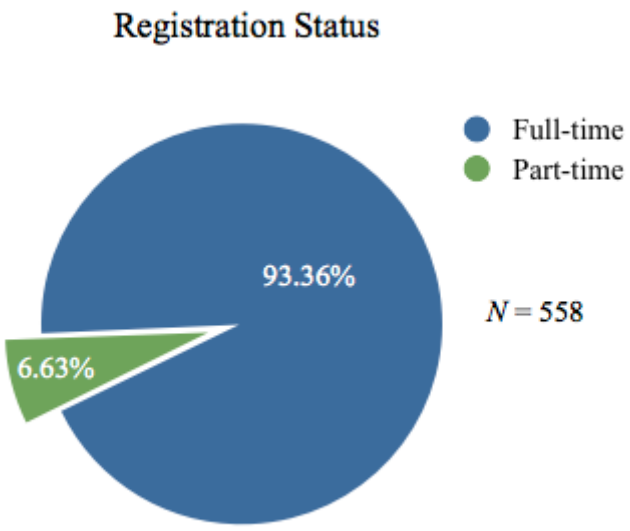

Figure 4.5. Demographic results: Registration status.

Table 4.3
Registration status (N = 558)

Responses	Online		Face-to-face	
	N = 409		*N* = 149	
	f	%	*f*	%
Full-time	376	91.93	145	97.31
Part-time	33	8.06	4	2.68

A Chi-square (χ^2) test showed that registration status responses had no significant association with the modality by which the students received instruction, $\chi^2(1, N = 558) = 3.522$, n.s.

Distance from campus

Students were asked about the distance they lived from campus. The response ranges were from on campus to more than 2 hours away. Of the five hundred and sixty total responses, 149 (26.60%) students reported living on campus, 366 (65.35%) reported living less than 30 minutes from campus, 41 (7.32%) reported living 30 minutes to one hour from campus, 3 (0.53%) reported living one hour to two hours from campus, and 1 (0.17%) reported living more than two hours from campus (see Figure 4.6 and Table 4.4).

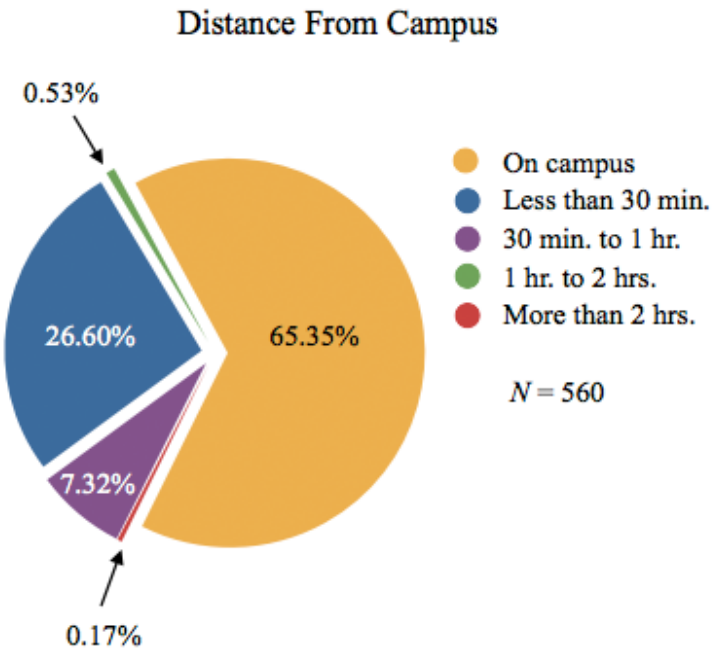

Figure 4.6. Demographic results: Distance from campus.

Table 4.4

Distance from campus (N = 560)

Responses	Online $N = 411$		Face-to-face $N = 149$	
	f	%	*f*	%
On campus	89	21.70	60	40.26
< 30 min.	292	71.21	74	49.66
30 min. to 1 hr.	26	6.34	15	1.00
1 hr. to 2 hrs.	3	0.73		
More than 2 hrs.	1	0.24		

A Chi-square (χ^2) test showed that distance from campus responses had a significant association with the modality by which the students received instruction, χ^2 (12.800, $N = 515$) = 0.741, $p < 0.05$.

Why online

Online students were asked to respond as to why they were taking the course online. The data from the reported responses were: 32 (8.60%) face-to-face class registration was full, 257 (69.10%) had conflicts with personal schedules, 51 (13.70%) said the course was not offered on campus/schedule conflict, 19 (5.10%) responded that distance or lack of transportation was an issue, 13 (3.49%) reported other family responsibilities (see Figure 4.7).

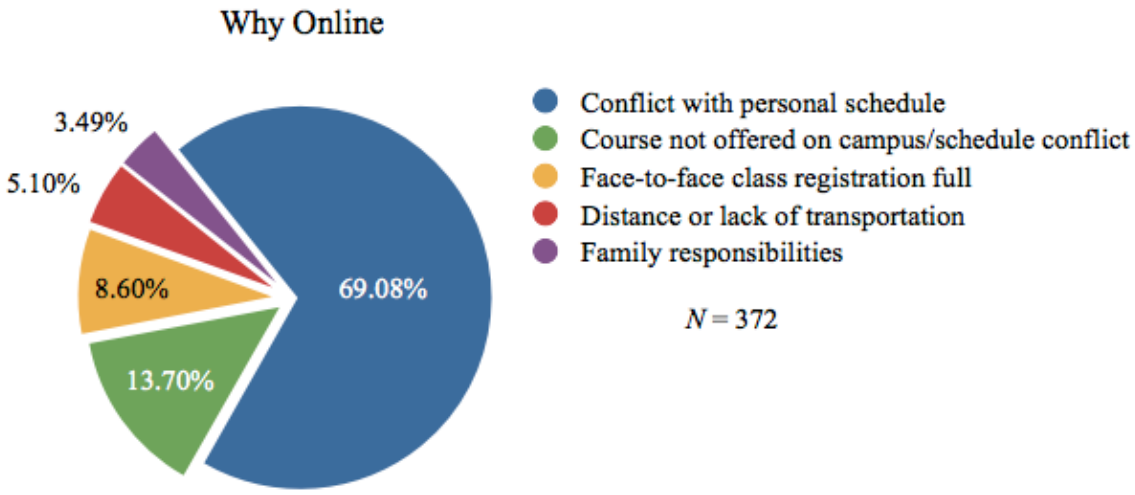

Figure 4.7. Demographic results: Why online.

Demographic Data: Interpretation of results

Analysis of the demographic data collected revealed that the majority of students participating in this study were taking the course online; of those students, nearly two-thirds (62.38%) of the respondents were female. Likewise, the majority (91.70%) of the students surveyed were of traditional college age (18-24) and enrolled as full-time

(93.36%) students. Slightly more than ninety percent of the respondents (91.95%) reported living either on campus or within less than thirty minutes from campus.

One additional question was asked of the online students; this question queried students about why they were taking the course online. Interestingly, the majority of respondents (69.08%) reported having a conflict with their personal schedules, another 13.70% reported not being able to enroll in the course either at their particular campus or having a scheduling conflict with when the course was offered.

Chi-square (χ^2) statistical analyses were conducted on the demographic data looking for an association between mode of instruction (online or face-to-face) and each of the following categories: gender, age, registration status, and distance from campus. Only the distance from campus category showed a significant association. This significance of association was expected from the differentiated populations.

Earned Points Analyses Results

A request was made and subsequently granted by the course's instructor to analyze student's grade data (represented as earned points) from each of the four sample populations: main campus online students, main campus face-to-face students, satellite campus online students, and satellite campus face-to-face students. Four computer spreadsheet files representing each enrolled student's final total earned points data were provided to the researcher with all student identifiers and names removed.

The maximum total number of earned points possible for this course were 300. The earned points were accumulated by each student from three examinations,

attendance, and twenty-nine individual assignments. The course instructor provided students with four five-point extra credit assignment (20 points total) opportunities for students to improve their final earned point tally.

The total number of students enrolled (as reported by the spreadsheet data) for this course was $N = 698$, where 521 were registered as students learning online while 177 were registered as face-to-face or attending a traditional live classroom lecture (face-to-face).

A mean analysis was run on the student's earned points totals. In the analysis students were separated by learning modality (online or face-to-face). The student grade data—expressed as earned points—revealed the following figures: online students at $N = 521$, $M = 222.61$, $SD = 83.42$, face-to-face $N = 177$, $M = 223.82$, $SD = 75.19$.

A combined mean analysis was run on the earned points scores and histogram information was analyzed separating students by learning modality. Histogram results revealed somewhat of an asymmetry, but the distribution shape was deemed to be a good enough approximation to a normal distribution shape to proceed with the samples *t*-test analysis.

An independent samples *t*-test was performed to assess whether students' mean earned points totals differed significantly for a group of 521 online participants taking an introductory Food Science course when compared with 177 face-to-face participants. Preliminary data screening indicated that reported results on student earned points were multimodal, but the departure from normality was not judged serious enough to require the use of a nonparametric test. The assumption of homogeneity of variance was assessed

by the Levene's test, $F = 1.13$, $p = 0.21$; this indicated no significant violation of the equal variance assumption. Therefore, the pooled variance version of the *t*-test was used. The mean earned points did not differ significantly, $t(698) = 0.07$, $p = 0.93$, two-tailed. Mean earned points for the online group were 0.16 points lower than mean earned points for the face-to-face group (See Table 4.14 for results.). The effect size, as indexed by Cohen's d (*d*) was 0.00; this is a small effect. The 95% CI for the difference between sample means $M_1 - M_2$, had a lower bound of -13.62 and an upper bound of 13.93. This statistical test suggests that earned points are not significantly different within this pooled population of online and face-to-face introductory Food Science students.

Phase 1: Confirm Teaching Presence Factors

Research Question 1 asked the following question: "Does the teaching presence scale "Online Teaching and Learning Questionnaire" (TP) (developed and validated by Shea et al. [2005]) exhibit the same factor structures for teaching presence as exhibited in Shea et al.'s (2005) findings when used with both online and face-to-face undergraduate college students?" The null hypothesis for this research question was: "The teaching presence scale developed by Shea et al. (2003) will NOT exhibit the same factor structure as present in Shea et al." The alternative hypothesis for this research question was: "The teaching presence scale developed by Shea et al. (2003) WILL exhibit the same factor structure as present in Shea et al."

Explanation of Analysis

This question sought to answer whether the teaching presence structures established and reported by Shea et al.'s (2005) exhibited the same or similar structures from this sample population. This question was answered using a Confirmatory Factor Analysis (CFA) statistical test in order to determine how well the collected data from TP fit Shea et al.'s (2005) prior established teaching presence model structures. The CFA test (Statistical Test 1 [CFA-ST1]) for model goodness-of-fit was conducted on all teaching presence data collected from this sample population ($N = 530$).

For additional exploratory purposes two subsequent CFA analyses were also conducted from both the online (CFA-ST2; $N = 400$) and face-to-face (CFA-ST3; $N = 130$) sample populations. Latent (factor) to observed variable covariance (factor loading) values for both CFA-ST2 and CFA-ST3 were then next compared. Finally, a table was produced to visually compare all factor loading values from each of the three CFA statistical tests with those reported by Shea et al. (2005) (see Table 4.8). See Figure 4.8 for a graphic depiction of Phase 1's described research process.

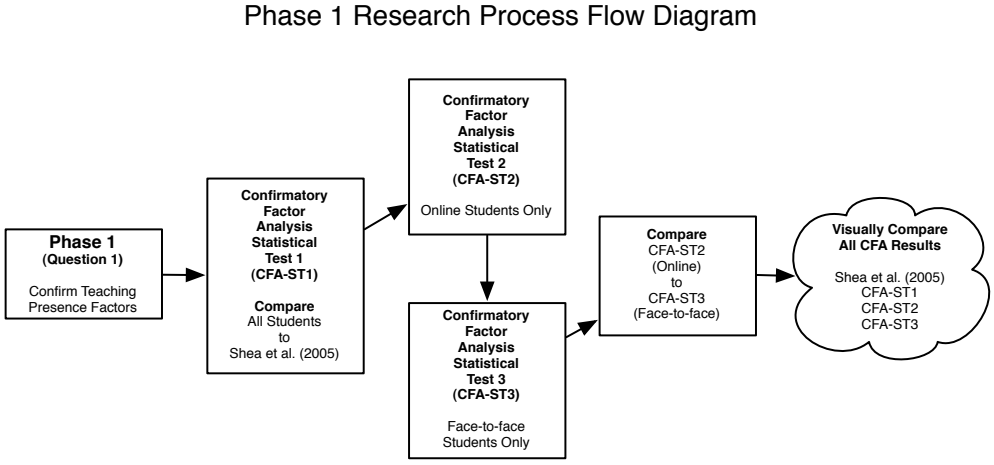

Figure 4.8. Phase 1 Research Process Flow.

Due to the nature of the additional subsequent analysis and the likelihood of possible skewed data from participants misinterpreting the question, one survey item in the directed facilitation sub-scale was omitted here. This item asked participants a question regarding the confirming of understanding. The question was worded as follows; "Overall, the instructor for this course provided explanatory feedback that helped me learn (for example, responded helpfully to discussion comments or course assignments)." The researcher excluded this question due its conflicting nature with this particular course's design and facilitation. Within this course, all online student inquiries as well as some face-to-face students inquiries were conducted by other course facilitators (course coordinator, graduate students, etc.), not the course instructor. For all online students enrolled in the course, there was no form of direct communication typically allowed with the instructor. This method of facilitation was done, as it was explained to the researcher by the instructor, primarily due to the especially large numbers of online students enrolled in the course. Therefore, it is noted that the omission of this single question likely had an effect on the CFA's reported model structure results and findings.

CFA-ST1: All Students Goodness-of-Fit Results for Shea et al.'s (2005) Teaching Presence Model Constructs

An original fit index was calculated on the sixteen item teaching presence model for all students ($N = 530$), which was subsequently deemed acceptable, $\chi^2(103) = 389.67$, $p < 0.01$, (CFI) = 0.91, (TLI) = 0.90, ($RMSEA$) = 0.07. This model showed that teaching presence for all students is predicted by instructional design and organization and directed facilitation. CFA-ST1 results are illustrated in Table 4.5 and Figure 4.9. Therefore, using Hu and Bentler's (1999) cut-off values guidelines, of RMSEA values close to 0.06 or below and CFI and TLI close to 0.95 or greater, the model may be interpreted as having a reasonably good fit.

Table 4.5
CFA Model results: All students (online and face-to-face N = 530)

Factors	*S.E.*	*Est/S.E.*	*Std.*	*Std.XY* (factor loading)
	Instructional design and organization			
Setting curriculum	0.00	0.00	0.51	0.72
Setting curriculum	0.06	16.56	0.55	0.76
Designing methods	0.06	14.91	0.52	0.68
Establishing time parameters	0.07	12.05	0.47	0.55
Utilizing the medium effectively	0.09	13.15	0.64	0.60
Establishing netiquette	0.09	11.91	0.52	0.55

	Directed Facilitation			
Identifying area of agreement/disagreement	0.00	0.00	0.60	0.68
Seeking to reach consensus	0.06	15.12	0.56	0.72
Reinforcing student contributions	0.60	12.26	0.44	0.57
Setting climate for learning	0.06	12.31	0.49	0.57
Drawing in participants, prompting discussion	0.06	13.69	0.55	0.64
Assessing the efficacy of the process	0.06	14.84	0.59	0.70
Presenting content/ questions	0.05	14.58	0.51	0.69
Focusing the discussion on specific issues	0.06	14.14	0.52	0.67
Confirming understanding	Omitted			
Diagnosing misconceptions	0.07	13.23	0.58	0.62
Injecting knowledge from diverse sources	0.06	12.19	0.48	0.57

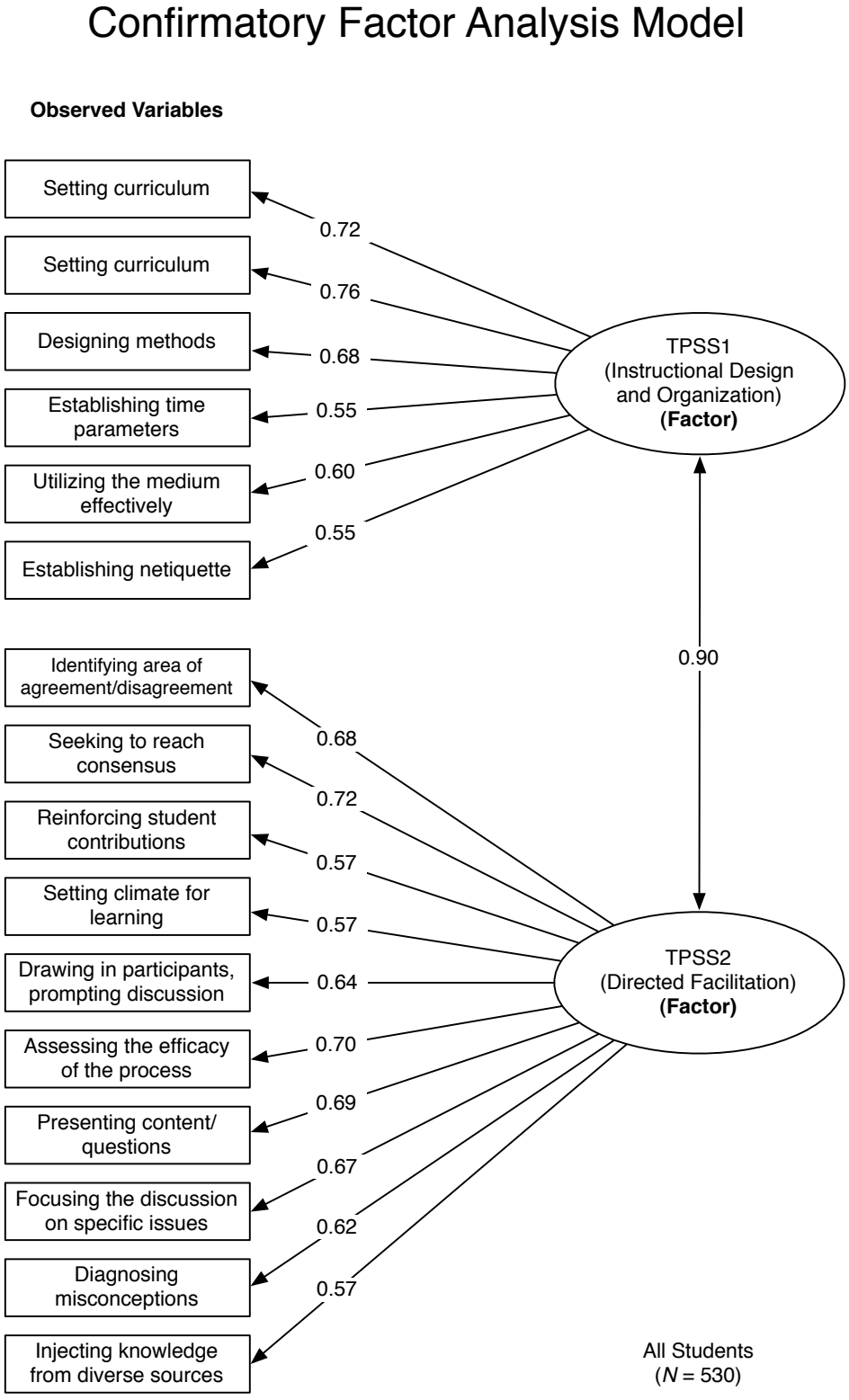

Figure 4.9. All students ($N = 530$) CFA latent to observed variable (factor loading) results.

An ideal factor structure would consist of all covariances (factor loadings) for observed variables at or greater than 0.60 and no latent variable (factor) cross loadings greater than 0.40 (Hu & Bentler, 1999). CFA-ST1 results showed that for the instructional design and organization factor "Setting curriculum" had the highest factor loading (0.76) and that both "Estimating time parameters" and "Establishing netiquette" had the lowest (0.55). For the directed facilitation factor "Seeking to reach consensus" had the highest factor loading (0.72) and three items "Reinforcing student contributions," "Setting climate for learning," and "Injecting knowledge from diverse sources" had the lowest (0.57). All other observed variables reported factor loadings between these high and low values. The results also revealed that factor cross loading values were high at 0.90. This indicates that the two teaching presence sub-scale factors were not very distinct for this sample population (See Figure 4.9 for results.).

An additional two fit indexes calculation were performed—as mentioned previously—to explore further the teaching presence data collected. This data was parsed from the sample collected by learning modality (online and face-to-face). As was to be expected from the prior CFA-ST1 (all students) results, both fit indexes showed a somewhat differentiation from one another. The individual CFA model goodness-of-fit results for CFA-ST2 and CFA-ST3 are reported below.

CFA-ST2: Online Students Goodness-of-Fit Results for Shea et al.'s (2005) Teaching Presence Model Constructs

Factor loadings reported in CFA-ST2 were similar but consistently lower overall than those reported in first test presented here (CFA-ST1) and by Shea et al. (2005). The highest factor loading values recorded, 0.71, were on "Setting the curriculum" and "Assessing the efficacy of the process." The lowest factor loading values observed were on "Establish time parameters" at 0.50. All other observed variables reported factor loadings between these high and low values. Refer to Figure 4.10 for an illustration of these factor loading results.

The fit of the sixteen item teaching presence model for online students ($N = 400$) was deemed acceptable, $\chi^2(120) = 348.05$, $p < 0.01$, (CFI) = 0.89, (TLI) = 0.87, ($RMSEA$) = 0.07. This model showed that teaching presence for all students is predicted by instructional design and organization and directed facilitation. CFA-ST2 results are illustrated in Table 4.6 and Figure 4.10. Again, using Hu and Bentler's (1999) cut-off values guidelines, of RMSEA values close to 0.06 or below and CFI and TLI close to 0.95 or greater, the model may be interpreted as having a reasonably good fit.

Table 4.6
CFA Model results: Online students (N = 400)

Factors	*S.E.*	*Est/S.E.*	*Std.*	*Std.XY* (factor loading)
	Instructional design and organization			
Setting curriculum	0.00	0.00	0.44	0.66
Setting curriculum	0.08	12.08	0.47	0.71
Designing methods	0.09	11.56	0.50	0.67
Establishing time parameters	0.10	9.00	0.41	0.50
Utilizing the medium effectively	0.14	11.02	0.68	0.63
Establishing netiquette	0.14	10.44	0.65	0.59
	Directed Facilitation			
Identifying area of agreement/disagreement	0.00	0.00	0.58	0.67
Seeking to reach consensus	0.07	12.70	0.54	0.71
Reinforcing student contributions	0.06	9.58	0.38	0.52
Setting climate for learning	0.07	9.83	0.43	0.54
Drawing in participants, prompting discussion	0.07	10.74	0.49	0.59

Assessing the efficacy of the process	0.08	12.59	0.59	0.71
Presenting content/ questions	0.06	11.84	0.46	0.66
Focusing the discussion on specific issues	0.07	11.21	0.46	0.62
Confirming understanding	Omitted			
Diagnosing misconceptions	0.08	10.67	0.53	0.59
Injecting knowledge from diverse sources	0.07	9.74	0.44	0.53

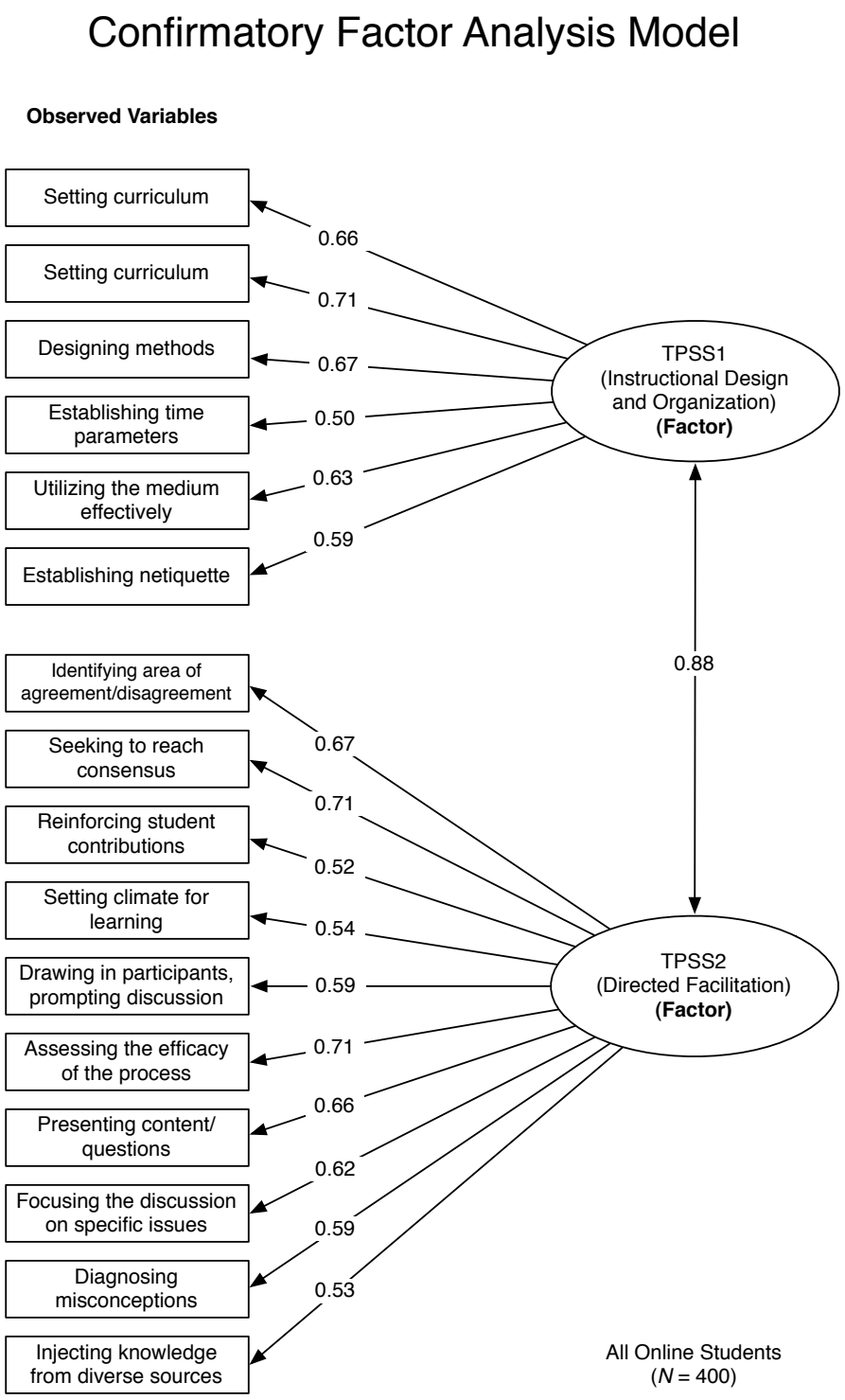

Figure 4.10. Online students ($N = 400$) CFA latent to observed variable (factor loading) results.

CFA-ST3: Face-to-face Students Goodness-of-Fit Results for Shea et al.'s (2005) Teaching Presence Model Constructs

Factor loadings reported in CFA-ST3 were similar agin but also consistently lower overall than those reported by Shea et al. (2005). The highest factor loading values recorded, 0.86, were on "Setting the curriculum." The lowest factor loading values observed were on "Establish netiquette" at 0.49. All other observed variables reported factor loadings between these high and low values. Refer to Figure 4.11 for an illustration of these factor loading results.

The fit of the sixteen item teaching presence model for face-to-face students (N = 130) was deemed acceptable, $\chi^2(103) = 151.18$, $p < 0.01$, (CFI) = 0.95, (TLI) = 0.95, ($RMSEA$) = 0.06. This model showed that teaching presence for all students is predicted by instructional design and organization and directed facilitation. CFA-ST3 results are illustrated in Table 4.7 and Figure 4.11. As stated previously, using Hu and Bentler's (1999) cut-off values guidelines, of RMSEA values close to 0.06 or below and CFI and TLI close to 0.95 or greater, the model may be interpreted as having a reasonably good fit.

Table 4.7
CFA Model results: Face-to-face students (N = 130)

Factors	*S.E.*	*Est/S.E.*	*Std.*	*Std.XY* (factor loading)
	Instructional design and organization			
Setting curriculum	0.00	0.00	0.68	0.84
Setting curriculum	0.08	12.32	0.71	0.86
Designing methods	0.08	9.39	0.57	0.72
Establishing time parameters	0.10	8.14	0.60	0.64
Utilizing the medium effectively	0.10	7.22	0.59	0.58
Establishing netiquette	0.11	5.81	0.46	0.49
	Directed Facilitation			
Identifying area of agreement/disagreement	0.00	0.00	0.66	0.74
Seeking to reach consensus	0.11	8.63	0.63	0.74
Reinforcing student contributions	0.11	7.82	0.59	0.68
Setting climate for learning	0.12	7.37	0.61	0.64
Drawing in participants, prompting discussion	0.12	8.95	0.71	0.77

Assessing the efficacy of the process	0.11	8.16	0.60	0.70
Presenting content/ questions	0.11	8.64	0.64	0.74
Focusing the discussion on specific issues	0.11	8.92	0.66	0.76
Confirming understanding	Omitted			
Diagnosing misconceptions	0.13	7.98	0.70	0.69
Injecting knowledge from diverse sources	0.11	7.54	0.59	0.65

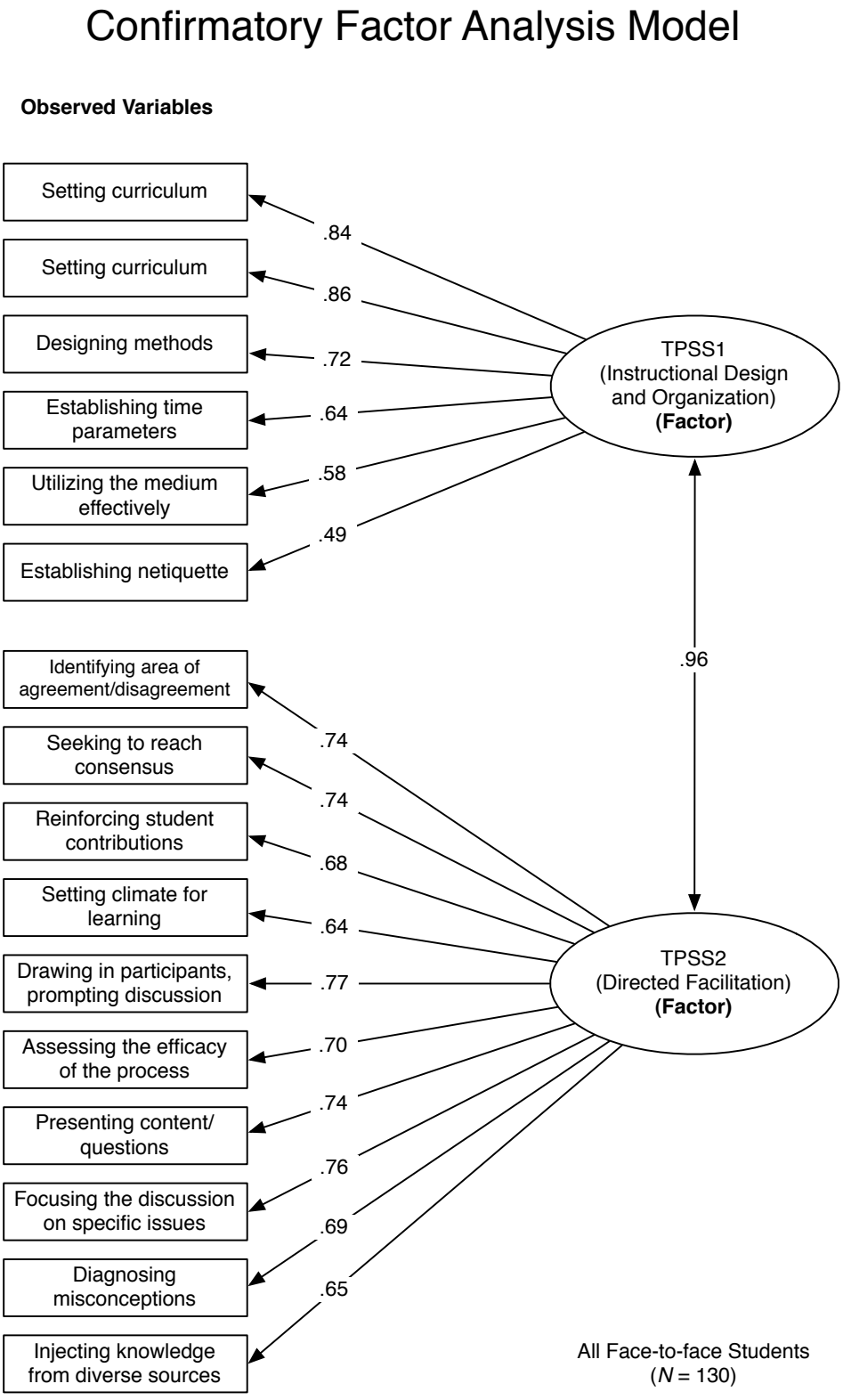

Figure 4.11. Face-to-face students ($N = 130$) CFA latent to observed variable (factor loading) results.

Online Students Goodness-of-Fit Comparison With Face-to-face Students

When comparing factor loading values from the two subsequent CFAs parsed from this sample population by learning modality, the results presented some interesting findings. In general, with the exception of two observed variables in the face-to-face sample population, "Utilizing the medium" and "Establishing netiquette," all covariances showed consistently higher factor loading values than those observed from the online sample population. The face-to-face sample population's CFA results in general showed a slightly better overall goodness-of-fit for the teaching presence model constructs established by Shea et al. (2005), with most factor loading values ranging at or near the 0.60 ideal mark (Hu & Bentler, 1999).

Looking deeper at the individual factor loading results, face-to-face students exhibited their greatest factor loading differences when compared with the online students' values measuring the instructor's ability to draw in participants and to prompt discussion ("Drawing in participants, prompting discussion") and reinforcing students contributions ("Reinforcing student contributions"). Conversely, online students' results had higher factor loading differences than the face-to-face students' observed variables values that most closely dealt with online aspects of the course ("Utilizing the medium effectively" and "Establishing netiquette"). The greatest similarity in covariances between the online and face-to-face students came upon "Assessing the efficacy of the process" and " Injecting knowledge from diverse sources" with nearly identical response factor loading values. Neither of the two sample populations (online and face-to-face) results appeared to load on TPSS1 or TPSS2

For the convenience of comparison all factor loading values from all samples (Shea et al. [2005], all students, online, and face-to-face) are represented and displayed below (see Table 4.8).

Table 4.8
Factor correlation values by population

Factors	Shea et al. (2005) *N* = 2036	CFA-ST1 Bentz (2009) All students *N* = 530	CFA-ST2 Bentz (2009) Online *N* = 400	CFA-ST3 Bentz (2009) Face-to-face *N* = 130
	Instructional design and organization			
Setting curriculum	-0.97	0.72	0.66	0.84
Setting curriculum	0.94	0.76	0.71	0.86
Designing methods	0.82	0.68	0.67	0.72
Establishing time parameters	-0.76	0.55	0.50	0.64
Utilizing the medium effectively	-0.51	0.60	0.63	0.58
Establishing netiquette	-0.35	0.55	0.59	0.49
	Directed Facilitation			
Identifying area of agreement/disagreement	0.88	0.68	0.67	0.74
Seeking to reach consensus	0.87	0.72	0.71	0.74

Reinforcing student contributions	0.83	0.57	0.52	0.68
Setting climate for learning	0.88	0.57	0.54	0.64
Drawing in participants, prompting discussion	0.99	0.64	0.59	0.77
Assessing the efficacy of the process	0.92	0.70	0.71	0.70
Presenting content/ questions	0.72	0.69	0.66	0.74
Focusing the discussion on specific issues	0.84	0.67	0.62	0.76
Confirming understanding	0.83	Omitted		
Diagnosing misconceptions	0.86	0.62	0.59	0.69
Injecting knowledge from diverse sources	0.74	0.57	0.53	0.65

Phase 1: Interpretation of Results

The initial CFA test (CFA-ST1) results from all student TP responses reported model goodness-of-fit scores from indices that were deemed acceptable for the two sub-scale teaching presence structure established by Shea et al. (2005). Additionally, the two subsequent CFAs tests (CFA-ST2 and CFA-ST3) computed separately for online and

face-to-face sample populations also reported acceptable goodness-of-fit scores toward the two sub-scale teaching presence structure established by Shea et al. (2005).

All three CFA sample population measures (all students, only online students, and only face-to-face students) showed support for Shea et al.'s (2005) revised teaching presence factor structures. When analyzed, online students overall showed the least amount of goodness-of-fit toward Shea et al.'s (2005) results and the revised teaching presence constructs. From the results reported here, the reduction from the Community of Inquiry's original three-factor structure to a two-factor construct (instructional design and organization, directed facilitation) as revised in Shea et al. (2005) showed acceptable goodness-of-fit indices for all three sample populations.

Phase 2: Relationship Between Instructor Satisfaction and Teaching Presence Measures

Research Question 2 asked the following question: "What is the relationship between student perceptions of teaching presence and instructor satisfaction?" The null hypothesis for this research question was: "There will NOT be a relationship between student perceptions of teaching presence and instructor satisfaction." The alternative hypothesis for this research question was: "There WILL be a relationship between student perceptions of teaching presence and instructor satisfaction."

Explanation of Analysis

This statistical analysis compared the measures on instructor satisfaction (CIEQ) to those on teaching presence (TP). The intent of this comparison was to explore whether

or not a relationship existed between the two instruments (See Figure 4.12 for a graphic depiction of Phase 2's research process.).

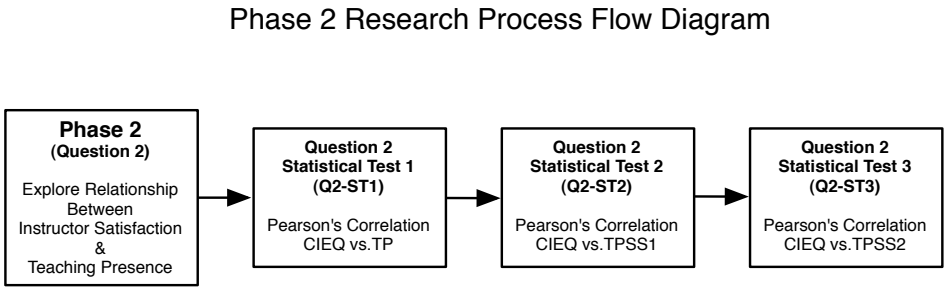

Figure 4.12. Phase 2 Research Process Flow.

This research question was answered using a Pearson's coefficient for correlations statistical test. The Pearson's correlation coefficient test was initially applied to all student ($N = 557$) response values as a method of investigating interactions between independent variables (instructor satisfaction [CIEQ] and teaching presences [TP]). In this investigation Shea et al.'s (2005) two-subscale teaching presence model structure was used. Shea et al. (2005) combined structures from the original three teaching presence sub-scale components established by Garrison (2000) and colleague's in the Community of Inquiry model into a new two sub-scale structure. The components of this new teaching presence structure have been defined as instructional design and organization (TPSS1) and directed facilitation (TPSS2).

The initial correlation test (Q2-ST1) explored for a relationship between instructor satisfaction and overall teaching presence with the two sub-scales combined as one measure. For additional exploratory purposes two additional subsequent test were performed to explore instructor satisfaction as it related to the two teaching presence sub-

scales (TPSS1 and TPSS2) from all student responses ($N = 557$). Statistical test 2 (Q2-ST2) consisted of a Pearson's correlation for all students between CIEQ and TPSS1. Likewise, Statistical test 3 (Q2-ST3) consisted of the Pearson's correlation for all students between CIEQ and TPSS2. These additional tests were performed to probe the data further in order to see if one teaching presence sub-scale was more related to instructor satisfaction than the other within the whole of this sample population.

Correlation Pre-Analysis

The first step in correlation computation is to check for normalization of the data (Warner, 2007). Histograms were produced for all student responses for the two measures CIEQ and TP, TPSS1, TPSS2 using SPSS version seventeen statistical software. The data was deemed acceptable and no transformations were applied.

Correlation: CIEQ and TP

The result from the initial Pearson's correlation test (QT2-ST1) for all students ($N = 557$) when analyzing for a correlation between CIEQ (instructor satisfaction) and TP (teaching presence) was statistically significant ($p < 0.05$). The r^2 was 0.25; thus about 25% of the variance from CIEQ could be correlated from the levels of TP. The scatter plot data for all students on CIEQ with TP suggested a weak positive relationship. See Figure 4.13 for scatter plot results of the combined data set and Figure 4.14 for the illustrated results.

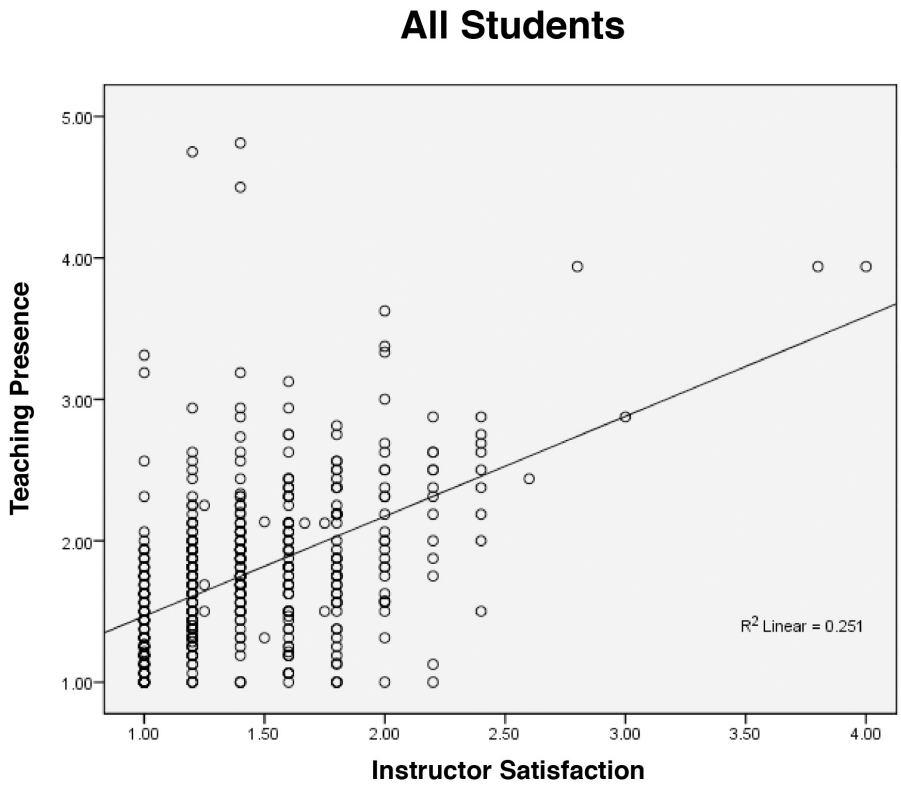

Figure 4.13. Distribution results ($r^2 = 0.25$, $N = 557$) for all students combined showing X (Instructor Satisfaction) variable and Y (Teaching Presence: all) variable.

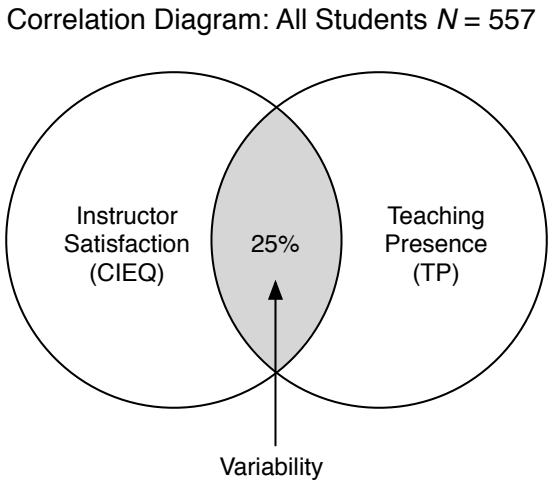

Figure 4.14. Percentage of variability between instructor satisfaction and teaching presence.

Correlation: CIEQ and TPSSI

The result from—the first of two additional—Pearson's correlation tests (QT2-ST2) for all students (N= 557) when analyzing for a correlation between CIEQ and TPSS1was statistically significant ($p < 0.05$). The r^2 was 0.19; thus about 19% of the variance from CIEQ could be correlated from the levels of TPSS1 (see Table 4.9). The scatter plot data for all students on CIEQ with TPSS1 suggested a weak positive relationship. See Figure 4.15 for scatter plot results of the combined data set and Figure 4.16 for the illustrated results.

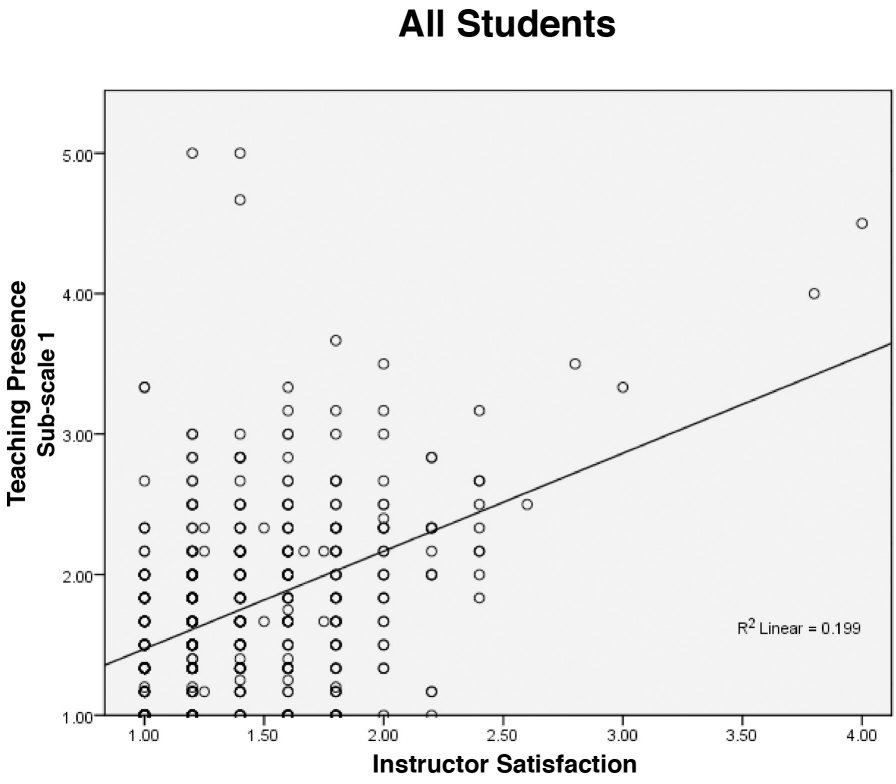

Figure 4.15. Distribution results ($r^2 = 0.19$, $N = 557$) for all students combined showing X (CIEQ) variable and Y (TPSS1) variable.

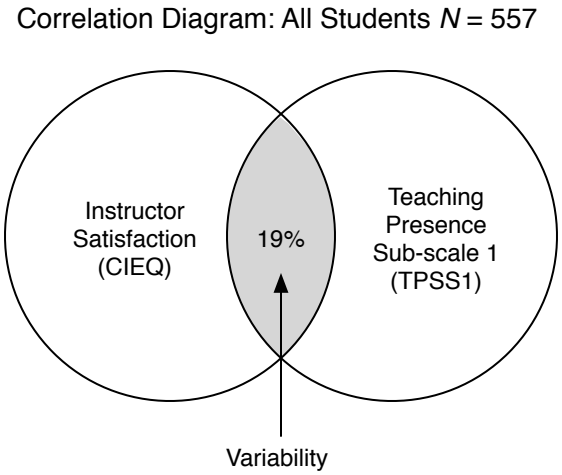

Figure 4.16. Percentage of variability between instructor satisfaction and teaching presence.

Table 4.9
Correlation 1: CIEQ and TPSS1

Correlation	*N* = 557	
	Values	CIEQ
CIEQ with TPSS1 (Instructional Design and Organization)	Pearson's	0.44
	Sig. (Two tail)	0.00

Correlation: CIEQ and TPSS2

The result from—the second of two additional—Pearson's correlation tests (QT2-ST3) for all students (N= 557) when analyzing for a correlation between CIEQ and TPSS1was statistically significant ($p < 0.05$). The r^2 was 0.23; thus about 23% of the variance from CIEQ could be correlated from the levels of TPSS2 (see Table 4.10). The scatter plot data for all students on CIEQ with TPSS2 suggested a weak positive relationship. See Figure 4.17 for scatter plot results of the combined data set and Figure 4.18 for the illustrated results.

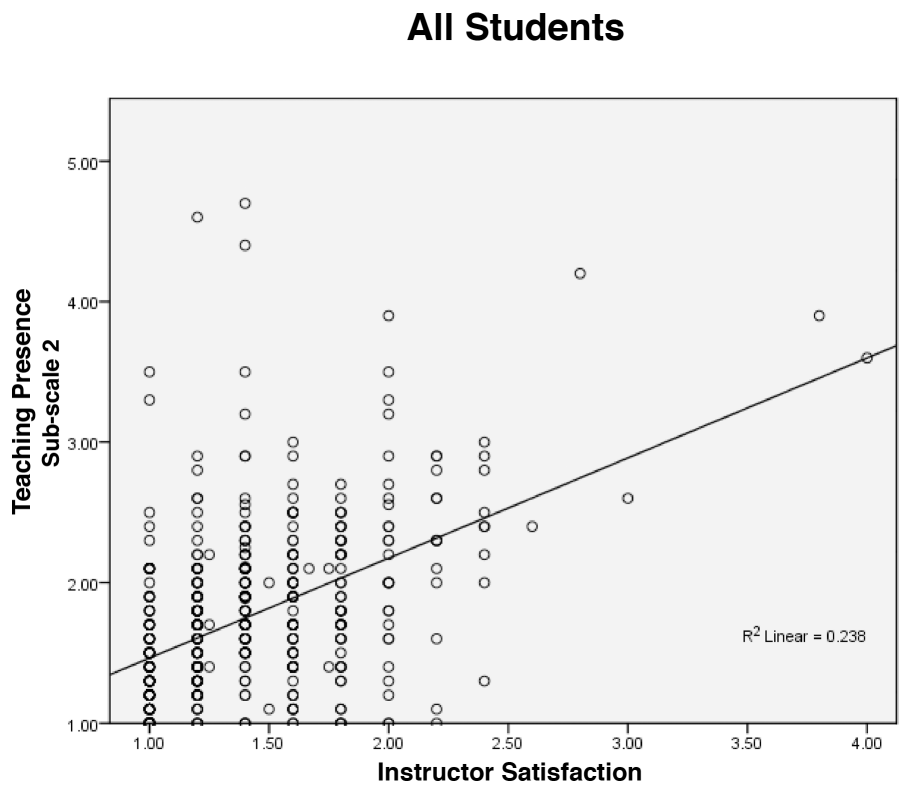

Figure 4.17. Data distribution results ($r^2 = 0.23$, $N = 557$) for all students combined showing X (CIEQ) variable and Y (TPSS2) variable.

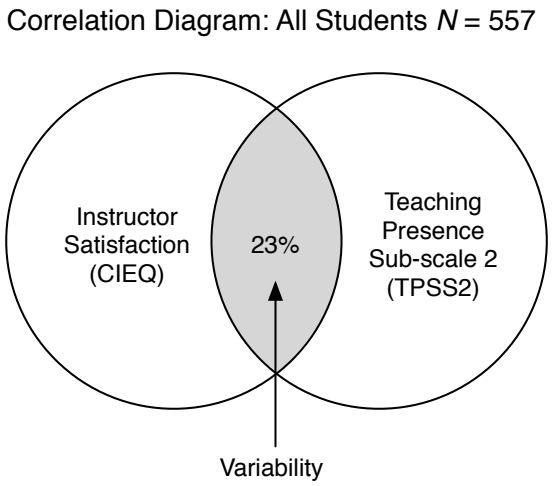

Figure 4.18. Percentage of variability between CIEQ and TPSS2.

Table 4.10
Correlation 2: CIEQ and TPSS2

Correlation	*N* = 557	
	Values	CIEQ
CIEQ with TPSS2 (Directed Facilitation)	Pearson's	0.48
	Sig. (Two tail)	0.00

Phase 2: Interpretation of Results

In Q2-ST1 Pearson's correlations showed a significant but weak positive relationship between CIEQ and TP, thus a rejection of the null hypothesis. A "positive relationship" means in this context that higher scores on CIEQ tended to be paired with higher scores on TP. It is likely that the weak correlation (25%) between CIEQ and TP was limited to some extent by either poor reliability and subsequent higher error rates

from the CIEQ instrument.

When reviewing the two additional correlation results (Q2-ST2 and Q2-ST3) between CIEQ and the two teaching presence sub-scales, TPSS2 (directed facilitation) exhibited a slightly higher correlation ($r^2 = 0.23$) than TPSS1 ($r^2 = 0.19$, instructional design and organization). Once again, it is likely here too that the same weak correlation values were limited by the same effects of poor reliability and subsequent higher error rates from the CIEQ instrument.

Phase 3: Relationship Between Instructor Satisfaction and Teaching Presence In Online and Face-to-face Conditions

As a follow-up to Research Question 2, Research Question 2a asked the following question: "Is this relationship (instructor satisfaction and teaching presence) similar when students participate in either online or face-to-face versions of the course?" The null hypothesis for this research question was: "The relationship between online and face-to-face students IS the same between teaching presence and instructor satisfaction." The alternative hypothesis for this research question was: "The relationship between online and face-to-face students is NOT the same between teaching presence and instructor satisfaction."

Explanation of Analysis

In this question Pearson's correlation values were analyzed to identify if a relationship existed between CIEQ and TP within the two sample populations (online and face-to-face students). Statistical test 1 (Q2a-ST1) consisted of a Pearson's correlation for online students between CIEQ and TP. Statistical test 2 (Q2a-ST2) consisted of a Pearson's correlation for face-to-face students between CIEQ and TP. Statistical test 3 (Q2a-ST3) consisted of a statistical test of significance of correlation (Pearson's *r*) between CIEQ and TP. This final test (Q2a-ST3) was intended to explore whether the two correlations results from Q2a-ST1 and Q2a-ST2 were significantly different than one another. The two independent variables consisting of online and face-to-face student populations with the dependent variables are CIEQ and TP (overall).See Figure 4.19 for a graphic depiction of Phase 3's research process.

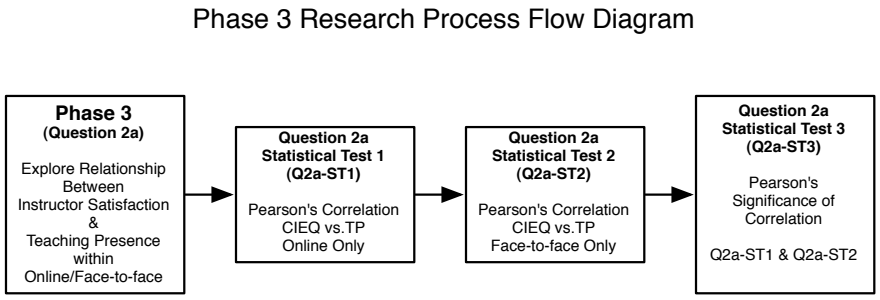

Figure 4.19. Phase 3 Research Process Flow.

Test for Significant Difference: CIEQ and TP (Online)

The result from—the first of two—Pearson's correlation tests Pearson's (QT2a-ST1) for online (N= 407) when analyzing for a correlation between CIEQ and TP was statistically significant ($p < 0.05$). The r^2 was 0.24; thus about 24% of the variance from CIEQ could be correlated from the levels of TP. The scatter plot data for online students on CIEQ with TP suggested a weak positive relationship. Refer to Figure 4.20 and Table 4.11 for the illustrated results.

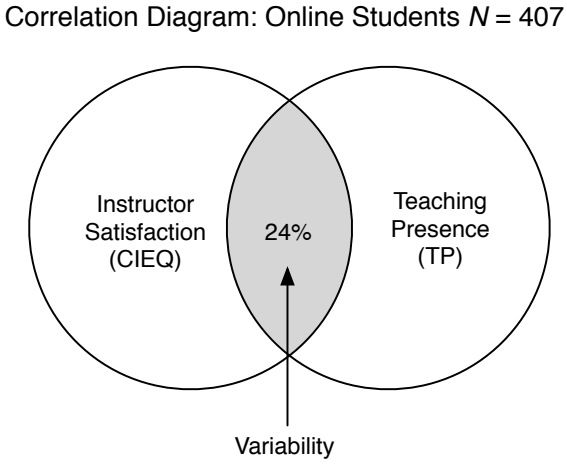

Figure 4.20. Percentage of variability between instructor satisfaction and teaching presence.

Table 4.11
Correlation 3: Online students

Correlation	$N = 407$	
	Values	CIEQ
CIEQ with TP	Pearson's	0.49
	Sig. (Two tail)	0.00

Test for Significant Difference: CIEQ and TP (Face-to-face)

The result from—the second of two—Pearson's correlation tests Pearson's (QT2a-ST2) for face-to-face (N= 150) when analyzing for a correlation between CIEQ and TP was statistically significant ($p < 0.05$). The r^2 was 0.26; thus about 26% of the variance from CIEQ could be correlated from the levels of TP. The scatter plot data for face-to-face students on CIEQ with TP suggested a weak positive relationship. Refer to Figure 4.21 and Table 4.12 for the illustrated results.

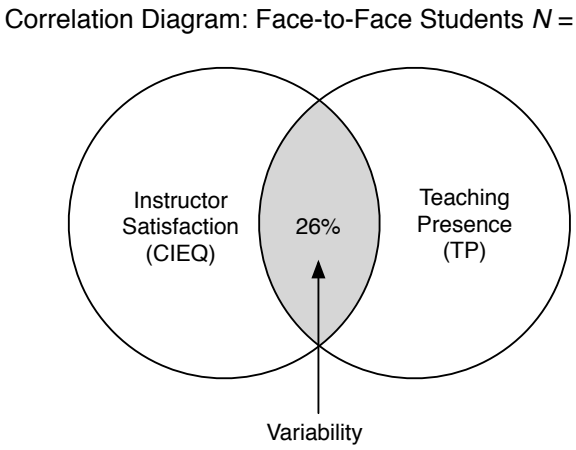

Figure 4.21. Percentage of variability between instructor satisfaction and teaching presence.

Table 4.12
Correlation 4: Face-to-face students

Correlation	*N* = 150	
	Values	CIEQ
CIEQ with TP	Pearson's	0.51
	Sig. (Two tail)	0.00

The final test in this phase (Q2a-ST3) was a statistical test for significance of correlations (Pearson's *r*) run on Q2a-ST2's and Q2a-ST3's correlation results. The purpose of this confidence measure was to test to see if *r* (Pearson's) would still be different than 0 if there were infinite data. Pearson's *r*-values were converted to *Z* = values using Fischer's *r*-to-*Z* transformation as recommended by Warner (2007). Fisher's

Z is used for computing confidence intervals and differences between independent correlations on prior obtained Pearson's correlation values.

No evidence of a statically significance relationship at the 95% confidence index (CI lower -0.21 to upper 0.16) level was found to exist between CIEQ and TP when measuring for correlation between online and face-to-face student responses. Results are reported in Table 4.13.

Table 4.13
Significance of correlation (N = 557)

CIEQ		TP		Outcome
r_a	0.49	r_b	0.51	z = -0.25
n_a	407	n_b	151	p = 0.80

Phase 3: Interpretation of Results

The findings for both Pearson's correlation tests for a relationship between CIEQ and TP appeared to be significant but weak in both populations (online and face-to-face) when analyzed independently from one another. This indicates that when CIEQ values increased that TP values correspondingly increased.

As was previously pointed out in Research Question 2, it likely that the same weak correlation values were limited to some extent by the same effects of poor reliability and subsequent higher error rates from the CIEQ instrument.

Phase 4: Difference Between Online and Face-to-face Groups

Research Question 3 asked the following question: "Do mean student ratings of instructor satisfaction and teaching presence differ when instruction is delivered either via online video or face-to-face lecture?" The null hypothesis for this research question was: "There is NOT a difference between online and face-to-face and instructor satisfaction and teaching presence and between online and face-to-face students rating of instructor satisfaction and teaching presence." The alternative hypothesis for this research question was: "There IS a difference between online and face-to-face and instructor satisfaction and teaching presence and between online and face-to-face students rating of instructor satisfaction and teaching presence."

Explanation of Analysis

This research phase continued the investigation of the findings from Research Questions 2 and 2a as a follow-up to the correlation procedures used in the these previous analyses. The intent of this follow-up was to explore if the independent variable (mode of instruction) had any effect on the dependent variables (CIEQ and TP). This phase's investigation began by reporting the two instrument's mean values. Next, preliminary Multiple Analysis of Variance (MANOVA) statistical analysis procedures were performed. See Figure 4.22 for a graphic depiction of Phase 4's research process.

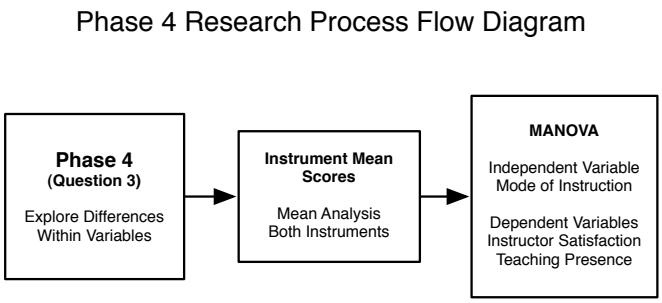

Figure 4.22. Phase 4 Research Process Flow.

Instrument Mean Scores

First, mean analyses were computed for the CIEQ and TP instruments. The subsequent mean values were then analyzed separately by the two population sample groups, online or face-to-face (see Tables 4.14 for instrument mean values.).

Table 4.14
CIEQ and TP Instrument mean scores

	Online			Face-to-face		
	N	*M*	*SD*	*N*	*M*	*SD*
CIEQ (*N* = 557) Four-point Likert-scale	407	1.38	0.39	150	1.38	0.38
TP (*N* = 561) Five-point Likert-scale	410	1.72	0.52	151	1.75	0.64

MANOVA

Following the computation of mean values an initial preliminary MANOVA data screening computation using a Box's *M* test for homoscedasticity was performed. Results from the Box's *M* test indicated a violation of the assumption for homogenous covariance across groups at $p < 0.05$ (Box's $M = 12.76$, $p < 0.05$). The Box M is a fairly stringent test for homoscedasticity and commonly reports Type II errors with large sample size and unbalanced groups. Therefore, an adjustment was made for the overall MANOVA to be tested at the $\alpha = 0.001$ level. The subsequent computation revealed that all three multivariate tests were not statically significant ($\alpha = 0.001$) (See Table 4.15 for results.). Thus, a decision was made to fail to reject the null hypothesis and no further statistical analyses were performed.

Table 4.15
MANOVA: Between subjects effects results

Measure	*df*	*MS*	*F*	η^2	*Sig.*
Online/Face-to-face					
CIEQ	1	0.01	0.06	0.00	0.79
TP	1	0.08	0.26	0.00	0.60
Error					
CIEQ	555	0.15			
TP	555	0.31			
Total					
CIEQ	557				
TP	557				

Phase 4: Interpretation of results

The MANOVA statistical test revealed no further information when exploring between the dependent variable (mode of instruction) and the two independent variables (CIEQ and TP). Therefore, the conclusion to this analysis was that there was no statistical significance realized when analyzing differences between online and face-to-face on student ratings of instructor satisfaction and teaching presence.

CHAPTER V

Discussion

The principle intent of this study was to explore the conceptual framework of teaching presence. Garrison et al. (2000) first posited teaching presence as one of the three primary components of their Community of Inquiry Model. In the Community of Inquiry Model, the teaching presence construct has been defined as consisting of design, facilitation, and direction of cognitive and social processes for the realization of personally meaningful and educationally worthwhile outcomes (Shea et al., 2003). These three defined constructs—exhibited by instructors of online learning environments—were posited in order to explain the necessary interactions between online students and their instructors. This exchange between students and instructors as suggested by the authors of the Community of Inquiry Model (Garrison, et al., 2000) is essential toward the establishment of a learning community of inquiry. Learning communities as, hypothesized, are crucial for online students' success (Garrison et al., 2000; Shea et al., 2003; Swan & Shea, 2005; Shea, Li, Swan & Pickett, 2005; Shea, Li, & Pickett, 2006).

The findings from this study's three research questions are presented in the following three sub-sections. These discussions cover findings from the statistical analysis results regarding the confirmatory factor analysis, correlations, and instrument mean ratings computations conducted.

Valid Measure of Teaching Presence

Much of this study's research design and subsequent statistical outcomes build upon the research of others, most notably the works of Shea et al. (2003) and Shea et al. (2005). Shea et al. (2003) first raised the need for a validated instrument to measure teaching presence. Shea et al. (2005) presented the first validated measure for teaching presence. Through their research these authors demonstrated that the previously hypothesized constructs for teaching presence could be reduced from a three-component structure—as originally posited—to a new two-component structure consisting of (1) instructional design/organization and (2) directed facilitation.

The first question in this study explored whether or not the teaching presence structures (instructional design/organization and directed facilitation) established by Shea et al. (2005) were present in this sample population. As was reported in the initial confirmatory factor analysis (CFA) test results, this sample population (all students) showed an acceptable amount of goodness-of-fit for Shea et al.'s (2005) two component teaching presence structure, although the goodness-of-fit was not as strong as those reported in Shea et al. (2005).

Investigating goodness-of-fit further, the current study conducted two additional separate CFA tests exploring teaching presence structures within the online and face-to-face sample populations. The results revealed that when analyzed separately, both online and face-to-face student responses showed goodness-of-fit results that aligned reasonably well with those found by Shea et al. (2005). In comparison to one another, factor loading

(covariance) values from the online sample population were somewhat lower than those computed for the face-to-face sample population.

In all likelihood CFA results were effected by the omission of the single teaching presence measurement item. The extent of the effect this omission caused on the results cannot be determined. Despite this limitation, the CFA results for the Online Teaching and Learning Questionnaire (TP) developed and validated by Shea et al. (2005) reaffirmed the validation of the instrument as a measure for teaching presence.

The first CFA goodness-of-fit results measuring all students within this sample population showed support for previous findings reported by Shea et al. (2005) that the components of teaching presence may be conceptualized from two distinct structures, instructional design/organization and directed instruction. From Shea et al.'s (2005) prior research the authors stated the following:

> It appears that the initial three-component framework for teaching presence proposed under the Community of Inquiry Model may need to be revised. Our factor analysis indicates that a two-component model composed of instructional design/organization and directed facilitation emerges from the data. Seventy percent of the variance for the teaching presence construct can be accounted for by these two factors (p. 70).

Likewise, the two additional CFA results performed helped to provide additional confirmation for the TP instrument's validation. Of note from these additional analyses was the fact that the teaching presence components exhibited acceptable goodness-of-fitness results from within a face-to-face learning environment. These results further

substantiate the potential for future research into teaching presence using the Online Teaching Presence Instrument within both online and face-to-face learning environments.

In spite of the limitations discussed previously, the CFA results provide further validation for the Online Teaching Presence Instrument and reaffirmation for the reduction in the teaching presence structure as reported by Shea et al. (2005). Moreover, these results provide further evidence for refinements toward the conceptualizations of the Community of Inquiry Model.

Instructor Satisfaction and Teaching Presence Correlations

The second research question was designed as an exploration of the relationship between students' sense of instructor satisfaction and teaching presence. The Aleamoni's Course/Instructor Evaluation Questionnaire (CIEQ) and the Online Teaching and Learning Questionnaire (TP) developed by Shea et al. (2005) were used. The investigation of this relationship was deemed important for two reasons: (1) To reveal distinctions in instructors' teaching behaviors that aided in the formation of a learning community; (2) That if the two measures (CIEQ and TP) could be demonstrated as related to one another, then the collection of both instructor satisfaction and teaching presence data in one fairly brief instrument might prove advantageous and meaningful to a variety of stakeholders (e.g. instructors, administrators, and future researchers, students).

The results from the correlation analyses portion found that all relationships explored between instructor satisfaction and teaching presence were weak. The initial

correlation analysis explored the instructor satisfaction and teaching presence relationship from the entire sample population. The results found that twenty-five percent (25%) of the variation for instructor satisfaction was accounted for and attributed to teaching presence. The additional correlation analyses conducted for the two teaching presence sub-scales and between the two instruments (CIEQ and TP) were also weak. Finally, when analyzed separately by sample population (online and face-to-face), both CIEQ and TP again revealed similar weak correlation findings.

This study's correlation results are reported with some caution, as the results were confounded in part by low reliability scores. Due to an error in the research design, only five items from the CIEQ instrument were used to measure instructor satisfaction. In most instances, measures from instruments with a greater number of questions tend to report higher reliabilities scores.

Overall the weak correlation results revealed that student ratings for instructor satisfaction did not relate strongly with ratings of teaching presence. Further, when attempting to correlated teaching presence more discreetly by its two sub-scales (instructional design/organization and directed facilitation) to instructor satisfaction, these results also were shown to be weak. Finally, when analyzed separately by sample population (online and face-to-face), both CIEQ and TP again revealed similar weak correlation findings. It seems plausible, as is evident from the undetermined correlation results, that the instruments used in this study were not strongly related suggesting that they may not be redundant.

Instrument Mean Ratings

The final question in this research sought to explore if the method by which students received their course lecture materials (online or face-to-face) made a difference in how they perceived their instructor on measures for instructor satisfaction or teaching presence. Overall mean response values for each measure (CIEQ and TP) were not differentiated when analyzed by sample population (online and face-to-face). These results support prior research by Spooner, Jordan Algozzine, and Spooner (1999). The researchers of this previous study found in courses taught both online and face-to-face by the same instructor there was no significant difference from student ratings for such items as overall ratings of the course, instructor, teaching and communication method.

This study was unique for its measures of both students from online and face-to-face learning environments. The students in this study were distinguished solely by the format in which they received their lecture content. Face-to-face students received live lecture content while attending a traditional classroom setting. The live lecture sessions were recorded and processed for the online students to view. These video recorded lectures typically were presented to online students within the same calendar day. All other course content materials were identical and presented to both online and face-to-face students via a campus Content Management System (CMS).

Even with a relatively large sample, this study did not demonstrate significant differences between mean teaching presence or instructor satisfaction scores based on the mode of instructional delivery. In this case mean scores on both instruments were low for

both modes of delivery. This suggests that other factors may have overshadowed the impact of the delivery mode on teaching presence and instructor satisfaction.

Recommendations

Research results presented here suggest that the teaching presence instrument as developed by Shea et al. (2005) exhibits valid constructs for measuring teaching presence within both online and face-to-face environments. These constructs were defined as instructional design/organization and directed facilitation. However, one criticism of the current study might be its lack of further exploration toward new conceptualizations within the research instrument and therefore the overall constructs of teaching presence as a whole. As recommended in Shea et al. (2005) and also pointed out in Arbaugh (2007), further refinement to the teaching presence constructs as these authors have suggested may be necessary not only to reflect additional research findings but to make the instrument more accurate and less confounded. The possibilities to further explore the constructs of teaching presence should be continued, as Arbaugh (2007) suggests, "...to determine how teaching presence can be measured more efficiently relative to the other elements of the CoI (Community of Inquiry) framework (p. 81)." Finally, relating continued research findings regarding teaching presence into practical and informative guidance toward improving both teaching and learning should not be overlooked by the research process. Future research should be aware of the possibilities to present or to illustrate practical online teaching and learning solutions.

The weak correlation results between instructor satisfaction and teaching presence presented here may or may not apply to different online or face-to-face learning environments. Given these findings, however, it is possible that differences in course subject matter, populations and campus geographical locations/settings may have differing results for correlation outcomes than those reported here. Prior research by Arbaugh (2005) has also suggested researchers examine relationships between elements of the Community of Inquiry Model with other variables such as subject matter, the software used to deliver the course to students, and characteristics of learners and/or instructors (p. 82). For instance, it is likely that courses with more direct instruction and greater students-to-instructor feedback or with different content and/or fewer students may have attained more coherent (or divergent) correlation results than those observed in this study. Ideally, future research would address diverse online learning environments in order to greater understand behaviors that might be influencing students' perceptions and outcomes from a variety of online teaching roles.

This study was unique in that it looked at a large number of undergraduate students enrolled both online and face-to-face in an introductory Food Science course. For many of the enrolled students, this course helped fulfill a laboratory science requirement within their major area of study. As is typical in many institutions of higher education, there were not enough classroom spaces to accommodate the large numbers of students attempting to fulfill such requirements. Thus, the limited availability of adequate classroom space has institutions looking toward alternative means of educational delivery.

Those researching the Community of Inquiry Model—specifically teaching presence—must include a more refined set of concepts and definitions for two terms *online learner* and *teacher/instructor*. The lack of a single good definition or a set of differentiated definitions for these two terms caused confusion for both student participants and the researcher alike during the data collection and the subsequent analysis phase of this study. For example, when responding to measures asked on the teaching presence instrument, many students had difficulty in how best to self report their enrollment status. Why? The researcher believes that the source of this confusion largely stems from the increased use of CMSs and the availability of course content to both online and face-to-face students via the Internet. In this sample population, students attending the face-to-face lectures generally resided on campus (40.26%), with much of their course work and examination materials being accessed through an online CMS. Adding to the confusion for the students and the researcher was the fact that the institution here allowed for a large number of students residing on-campus to enroll in online sections (21.70%) of the course. The figures suggest that many of these students deemed as *online* accessed the same course materials as their face-to-face counterparts from similar on-campus venues (dorm rooms, fraternity/sorority houses, on-campus computer labs, and so on). For many of the online students—as discussed previously in this research—the greatest distinction for learning these materials was simply in how they accessed their lecture content (via video stream or by live lecture).

Likewise, as enrollments increase, large enrollment courses will also require higher levels of production and support. Dual modality courses (delivered online and

face-to-face by the same instructor with the same content) like this one will most likely exceed the resources or expertise of any one individual instructor. Thus a variety of other individuals—as in this case—will most likely be asked and subsequently utilized to aid in facilitating many of the instructor's traditional duties. As was observed in this study, these support individuals are likely to assist instructors with the construction of the course, with directing student communication, with posting and delivery of course content to the CMS, with online examination procedures, and so on. An increased influence on course materials and interactions with students from additional facilitators will likely cause the traditionally defined role of *teacher/instructor* to increasingly become oblique and obscured for both online and face-to-face students. Other online educational researcher have also noted a need for a clearer definition of the term *teacher/instructor* as well (Anagnostopoulos, Basmadian, & McCrory, 2005). Therefore, this researcher supports these prior recommendations and strongly urges the term *teacher/instructor* continue to be further explored and refined.

Additional research on the Community of Inquiry model should be undertaken with the purpose of refining and defining the model's constructs. Since its inception, Garrison and colleagues' Community of Inquiry Model (2000) has provided those interested in online educational research with a framework in which to conceptualize learning interactions and interpersonal exchange experiences within online learning environments. Empirical research until now has helped to shape and to validate several of the model's core components. Garrison (2007) in his review of the research has pointed out that many of the studies to the time of his writing had tended to cluster largely on two

of the core components, social presence and teaching presence, with social presence receiving the greatest amount of study as of his writing. The research objects in the current study have built upon other's prior research regarding the Community of Inquiry Model. All of the many studies cited here—including this one—have helped to contribute to the body of research surrounding the Community of Inquiry Model. The researcher of this study agrees with Garrison's (2007) recommendation that further efforts be taken in future research to extend the Community of Inquiry model's posited three core components (social, teaching, and cognitive presence) for greater interrelations.

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Table A1

Teaching Presence Items Correlation Matrix Results Shea, et al. (2005)

		Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q8	Setting curriculum	1.00						
Q9	Setting curriculum	0.88	1.00					
Q10	Designing methods	0.81	0.81	1.00				
Q11	Establishing time parameters	0.72	0.72	0.73	1.00			
Q12	Utilizing the medium effectively	0.71	0.74	0.75	0.68	1.00		
Q13	Establishing netiquette	0.62	0.64	0.65	0.60	0.72	1.00	
Q14	Identifying area of agreement/disagreement	0.62	0.64	0.63	0.55	0.67	0.67	1.00
Q15	Seeking to reach consensus	0.66	0.69	0.67	0.58	0.71	0.66	0.83
Q16	Reinforcing student contributions	0.61	0.63	0.62	0.56	0.66	0.61	0.73
Q17	Setting climate for learning	0.60	0.62	0.62	0.53	0.66	0.63	0.72
Q18	Drawing in participants, prompting discussion	0.59	0.60	0.59	0.51	0.65	0.61	0.75
Q19	Assessing the efficacy of the process	0.64	0.66	0.65	0.58	0.69	0.65	0.78
Q20	Presenting content/questions	0.66	0.69	0.67	0.57	0.68	0.62	0.72
Q21	Focusing the discussion on specific issues	0.64	0.66	0.64	0.55	0.68	0.63	0.74
Q22	Confirming understanding	0.65	0.67	0.67	0.58	0.70	0.61	0.76
Q23	Diagnosing misconceptions	0.61	0.63	0.61	0.55	0.65	0.61	0.74
Q24	Injecting knowledge from diverse sources	0.59	0.62	0.60	0.54	0.67	0.60	0.68

Teaching Presence Items Correlation Matrix Results Shea, et al. (2005)

	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
Q15 Seeking to reach consensus	1.00									
Q16 Reinforcing student contributions	0.75	1.00								
Q17 Setting climate for learning	0.76	0.76	1.00							
Q18 Drawing in participants, prompting discussion	0.77	0.76	0.79	1.00						
Q19 Assessing the efficacy of the process	0.81	0.76	0.76	0.84	1.00					
Q20 Presenting content/questions	0.78	0.68	0.70	0.70	0.76	1.00				
Q21 Focusing the discussion on specific issues	0.79	0.71	0.74	0.75	0.78	0.83	1.00			
Q22 Confirming understanding	0.80	0.78	0.72	0.74	0.77	0.75	0.76	1.00		
Q23 Diagnosing misconceptions	0.78	0.72	0.71	0.71	0.75	0.73	0.73	0.82	1.00	
Q24 Injecting knowledge from diverse sources	0.71	0.65	0.69	0.68	0.70	0.72	0.71	0.71	0.72	1.00

Table B1

Teaching Presence Items Correlation Matrix Results Bentz (2009)

		Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q8	Setting curriculum	1.00						
Q9	Setting curriculum	0.66	1.00					
Q10	Designing methods	0.47	0.53	1.00				
Q11	Establishing time parameters	0.39	0.41	0.46	1.00			
Q12	Utilizing the medium effectively	0.37	0.37	0.41	0.35	1.00		
Q13	Establishing netiquette	0.35	0.30	0.36	0.25	0.58	1.00	
Q14	Identifying area of agreement/disagreement	0.41	0.44	0.39	0.29	0.40	0.47	1.00
Q15	Seeking to reach consensus	0.47	0.51	0.46	0.30	0.40	0.43	0.60
Q16	Reinforcing student contributions	0.41	0.44	0.40	0.39	0.30	0.26	0.33
Q17	Setting climate for learning	0.33	0.42	0.33	0.28	0.31	0.27	0.35
Q18	Drawing in participants, prompting discussion	0.40	0.43	0.42	0.32	0.40	0.32	0.41
Q19	Assessing the efficacy of the process	0.43	0.46	0.43	0.37	0.40	0.34	0.48
Q20	Presenting content/questions	0.45	0.48	0.43	0.37	0.37	0.30	0.43
Q21	Focusing the discussion on specific issues	0.42	0.49	0.41	0.34	0.36	0.33	0.45
		Omitted						
Q22	Diagnosing misconceptions	0.36	0.43	0.35	0.26	0.35	0.35	0.47
Q23	Injecting knowledge from diverse sources	0.37	0.41	0.31	0.23	0.34	0.31	0.37

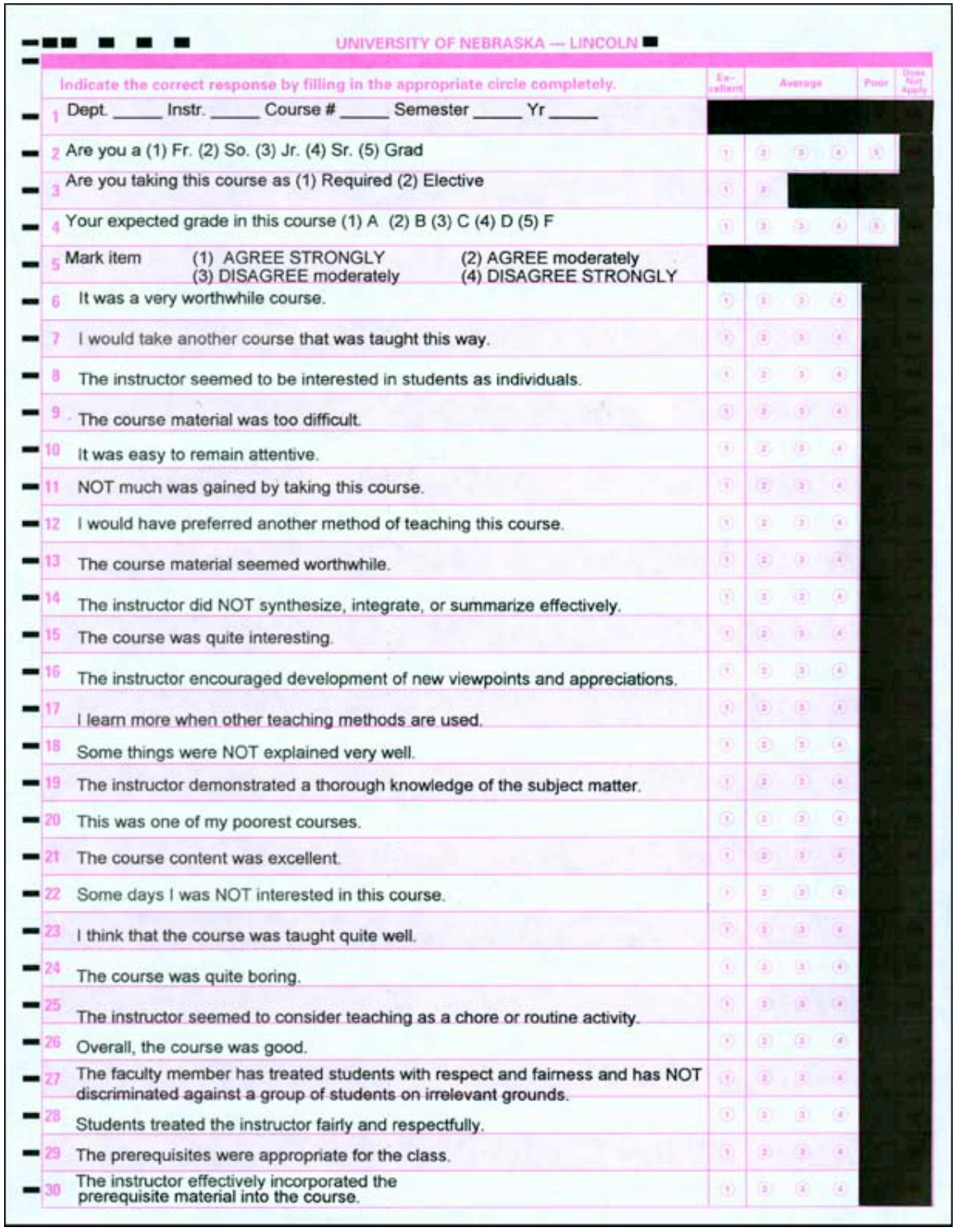
Teaching Presence Items Correlation Matrix Results Bentz (2009)

	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Omitted	Q23	Q24
Q15 Seeking to reach consensus	1.00									
Q16 Reinforcing student contributions	0.39	1.00								
Q17 Setting climate for learning	0.40	0.38	1.00							
Q18 Drawing in participants, prompting discussion	0.43	0.44	0.45	1.00						
Q19 Assessing the efficacy of the process	0.51	0.42	0.36	0.51	1.00					
Q20 Presenting content/questions	0.49	0.36	0.38	0.40	0.54	1.00				
Q21 Focusing the discussion on specific issues	0.43	0.32	0.37	0.41	0.48	0.50	1.00			
			Omitted							
Q23 Diagnosing misconceptions	0.43	0.32	0.41	0.36	0.41	0.43	0.44		1.00	
Q24 Injecting knowledge from diverse sources	0.37	0.31	0.36	0.35	0.34	0.43	0.44		0.40	1.00

APPENDIX C

Course/Instructor Evaluation Questionnaire (CIEQ) Instrument 1

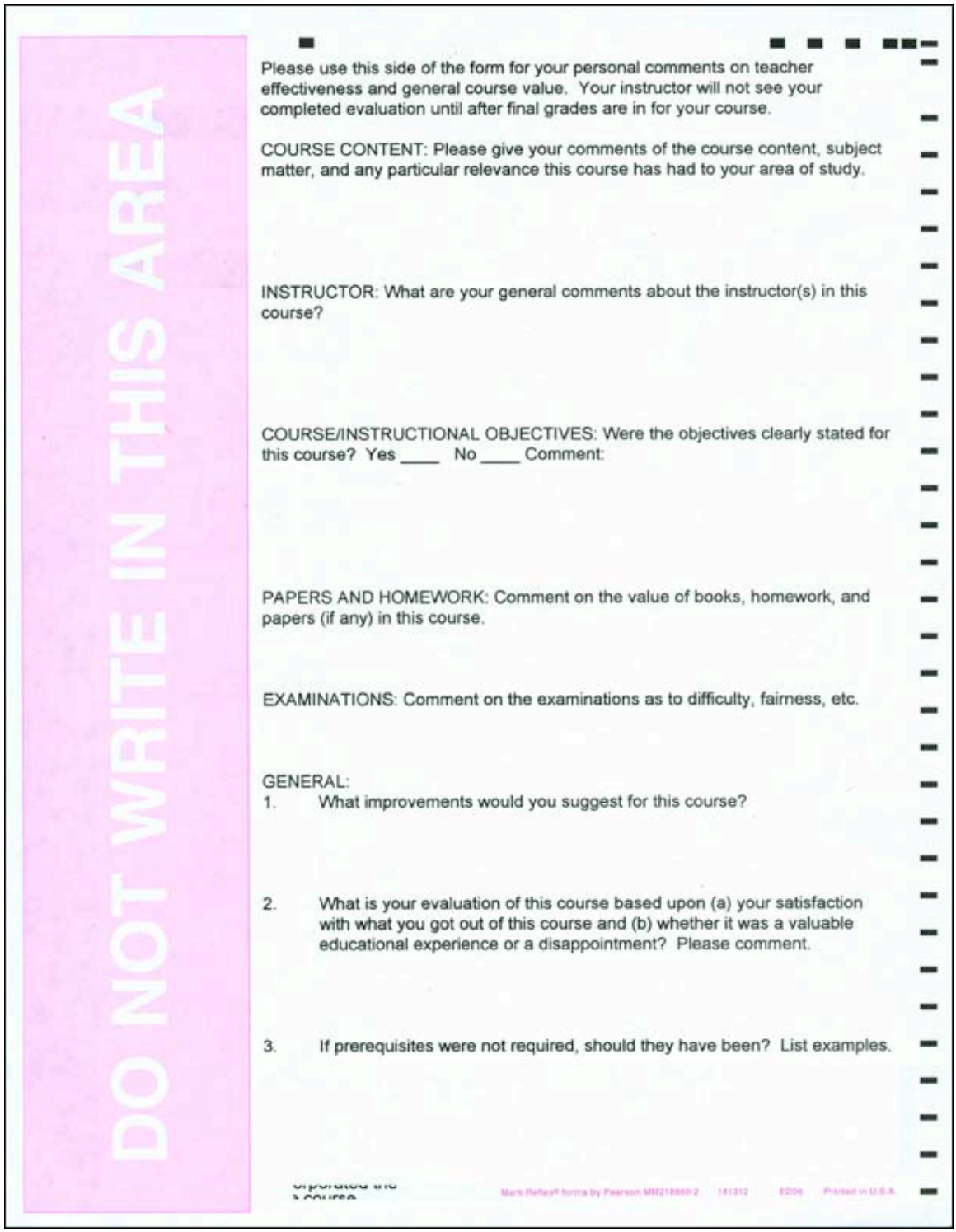
CIEQ form front



UNIVERSITY OF NEBRASKA — LINCOLN

Indicate the correct response by filling in the appropriate circle completely.	Excellent	Average			Poor	Does Not Apply
1 Dept. _____ Instr. _____ Course # _____ Semester _____ Yr _____						
2 Are you a (1) Fr. (2) So. (3) Jr. (4) Sr. (5) Grad	1	2	3	4	5	
3 Are you taking this course as (1) Required (2) Elective	1	2				
4 Your expected grade in this course (1) A (2) B (3) C (4) D (5) F	1	2	3	4	5	
5 Mark item (1) AGREE STRONGLY (2) AGREE moderately (3) DISAGREE moderately (4) DISAGREE STRONGLY						
6 It was a very worthwhile course.	1	2	3	4		
7 I would take another course that was taught this way.	1	2	3	4		
8 The instructor seemed to be interested in students as individuals.	1	2	3	4		
9 The course material was too difficult.	1	2	3	4		
10 It was easy to remain attentive.	1	2	3	4		
11 NOT much was gained by taking this course.	1	2	3	4		
12 I would have preferred another method of teaching this course.	1	2	3	4		
13 The course material seemed worthwhile.	1	2	3	4		
14 The instructor did NOT synthesize, integrate, or summarize effectively.	1	2	3	4		
15 The course was quite interesting.	1	2	3	4		
16 The instructor encouraged development of new viewpoints and appreciations.	1	2	3	4		
17 I learn more when other teaching methods are used.	1	2	3	4		
18 Some things were NOT explained very well.	1	2	3	4		
19 The instructor demonstrated a thorough knowledge of the subject matter.	1	2	3	4		
20 This was one of my poorest courses.	1	2	3	4		
21 The course content was excellent.	1	2	3	4		
22 Some days I was NOT interested in this course.	1	2	3	4		
23 I think that the course was taught quite well.	1	2	3	4		
24 The course was quite boring.	1	2	3	4		
25 The instructor seemed to consider teaching as a chore or routine activity.	1	2	3	4		
26 Overall, the course was good.	1	2	3	4		
27 The faculty member has treated students with respect and fairness and has NOT discriminated against a group of students on irrelevant grounds.	1	2	3	4		
28 Students treated the instructor fairly and respectfully.	1	2	3	4		
29 The prerequisites were appropriate for the class.	1	2	3	4		
30 The instructor effectively incorporated the prerequisite material into the course.	1	2	3	4		

CIEQ form back



APPENDIX D

Teaching Presence Survey Instrument 2

Teaching Presence Measurement Instrument

Instructions: There are 27 questions in this survey. This survey is designed to take less than 10 minutes to complete. If you are uncertain about any item simply leave it blank.

Near the end there are questions asking you to respond based on how you took this course either online or face-to-face. Please follow the instructions closely for these items.

Starting at question number one (1) on your bubble sheet please mark the following:

1. Your are taking this course?
    - 1 - Online
    - 2 - Face-to-face in a classroom
2. Gender:
    - 1 - Male
    - 2 - Female
3. Age:
    - 1 - 18-24
    - 2 - 25-34
    - 3 - 35-44
    - 4 - 45-54
    - 5 - 55-64
4. Registration Status:
    - 1 - Full-time
    - 2 - Part-time
5. Employment Status:
    - 1 - Full-time
    - 2 - Part-time
6. Distance from campus:
    - 1 - On campus
    - 2 - < 30 min.
    - 3 - 30 min. to 1 hr.
    - 4 - 1 hr. to 2 hrs.
    - 5 - More than 2 hrs.
7. Why online (leave blank if none of the following apply):
    - 1 - Face-to-face class registration full
    - 2 - Conflict with personal schedule
    - 3 - Course not offered on campus/schedule conflict
    - 4 - Distance or lack of transportation

5 - Family responsibilities

8. Overall, the instructor for this course clearly communicated important course outcomes (for example, provided documentation on course goals).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

9. Overall, the instructor for this course clearly communicated important course topics (for example, provided a clear and accurate course overview).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

10. Overall, the instructor for this course provided clear instructions on how to participate in course learning activities (for example, provided clear instructions on how to complete course assignments successfully).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

11. Overall, the instructor for this course clearly communicated important due dates/time frames for learning activities that helped me keep pace with the course (for example, provided a clear and accurate course schedule, due dates and more).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

12. Overall, the instructor for this course helped me take advantage of the online environment to assist my learning (for example, provided clear instructions on how to participate in online discussion forums).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

13. Overall, the instructor for this course helped students to understand and practice the kinds of behaviors acceptable in online learning environments (for example, provided documentation on netiquette i.e., polite forms of online interaction).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

14. Overall, the instructor for this course was helpful in identifying areas of agreement and disagreement on course topics in ways that assisted me to learn.

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

15. Overall, the instructor for this course was helpful in guiding the class towards agreement/understanding about course topics in a way that assisted me to learn.

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

16. Overall, the instructor in this course acknowledged student participation in the course (for example, replied in a positive, encouraging manner to student submissions).

1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

17. Overall, the instructor for this course encouraged students to explore new concepts in

this course (for example, encouraged thinking out loud or the exploration of new ideas).
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

18. Overall, the instructor for this course helped keep students engaged and participating in productive dialogue.
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

19. Overall, the instructor for this course helped keep the participants on task in a way that assisted my learning.
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

20. Overall, the instructor for this course presented content or questions that helped me to learn.
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

21. Overall, the instructor for this course helped to focus discussion on relevant issues in a way that assisted me to learn.
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

22. Overall, the instructor for this course helped me to revise my thinking (for example, correct misunderstandings) in a way that helped me to learn.
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

23. Overall, the instructor for this course provided useful information from a variety of sources that assisted me to learn (for example, references to articles, textbooks, personal experiences, or links to relevant external websites).
1- strongly agree, 2-agree, 3-neutral, 4-disagree, 5-strongly disagree

DIRECTIONS:
If you took this course online, please answer question 24.
If you took this course face-to-face, skip to question 25.

24. Think of a similar course you have taken in the classroom. Compared to that course (i.e., a course that was not online) how would you rate your level of learning in this course?
1 - I learned more in the classroom than in this online course.
2 - I learned about the same in this online course as I did in the classroom.
3 - I learned more in this online course than I did in the classroom.

25. Think of a similar course you have taken in the classroom that did not contain any online components (items found in Blackboard for example). Compared to that course, how would you rate your level of learning in this course?
1 - The online components helped me learn, so I learned more in this course.

2 - The online components had no impact on my learning; I learned about the same in this course.
3 - The online components had a negative impact on my learning; I learned less in this course.
4 - Not applicable—I was unaware that this course used online components, or I did not go to the course website.

DIRECTIONS:
If you took this course online, please answer question 26.
If you took this course face-to-face, skip to question 27.

26. Based on your experience, would you consider taking other online courses in the future?

1 - Yes, as many as possible.
2 - Yes, some additional courses.
3 - Undecided.
4 - No, unless absolutely necessary
5 - No.

27. Based on your experience in this course, would you consider taking other courses with online components (items found in Blackboard for example) in the future?

1 - Yes, as many as possible.
2 - Yes, some additional courses.
3 - Undecided.
4 - No, unless absolutely necessary
5 - No.

APPENDIX E

University of Nebraska-Lincoln Institutional Review Board Research Approval Letter

University of Nebraska Lincoln

David Bentz
Teaching, Learning and Teacher Education
3611 B St
Lincoln, NE 68510

James King
Agricultural Leadership, Education and Communication
300 AGH
UNL 68583-0709

IRB Number: 2008-04-8813 EX
Project ID: 8813
Project Title: ONLINE AND FACE-TO-FACE CLASSES: A COMPARATIVE ANALYSIS OF EIGHT LARGE-SCALE FOOD SCIENCE CLASSES

Dear David:

The Institutional Review Board for the Protection of Human Subjects has completed its review of the Request for Change in Protocol submitted to the IRB.

1. It has been approved to add an additional instrument to measure students perceptions regarding teaching presence.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

- Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This letter constitutes official notification of the approval of the protocol change. You are therefore authorized to implement this change accordingly.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,
Mario Scalora, Ph.D.
Chair for the IRB

APPENDIX F

Letter of Consent and Participant Data Collection Procedure Instructions

University of Nebraska Lincoln

COLLEGE OF EDUCATION AND HUMAN SCIENCES
Department of Teaching, Learning and Teacher Education

December 14, 2008

Dear Food Science 131 Student:

I am writing seeking your help in a study I'm conducting as part of my graduate research in Instructional Technology at the University of Nebraska – Lincoln. The purpose of this study is to compare expressed differences and opinions between students attending the Food Science 131 course in a face-to-face environment with those also taking the course online.

Results from this survey will help identify challenges and successes faced by FDST 131 students and to distinguish different strategies students' use in each learning environment. With your help it is hoped that a clearer picture of the needs faced by students, institutions, and educators alike can better be addressed when taking course via either face-to-face or online. By knowing more about your particular experiences within your learning environment it is the objective of this survey to reveal vital information that will aid in improving this course in the future.

Please aid my research by taking a moment to fill out a short survey I have put together for you and your FDST 131 classmates.

Instructions for filling out this survey are as follows:

1. Remove both the survey and the response sheet (blue bubble sheet) from the envelope.
2. Only mark the response sheet (blue bubble sheet) in the numbered area, beginning at number 1. If you have questions, ask your consultant for assistance.
3. Using a No. 2 pencil answer each question honestly and to the best of your ability. Leave any question(s) you do not care to answer blank.
4. Place both the survey and the response sheet (blue bubble sheet) back in the envelope.
5. Hand in your materials.

All the data gathered during this study, which was described above, will be kept strictly confidential. The results of this study may be published in scientific journals or presented at professional meetings, but, if this happens, your identity will be kept strictly confidential. Please, take a few minutes to share your FDST 131 experience and opinions.

118 Henzlik Hall / P.O. Box 880355 / Lincoln, NE 68588-0355 / (402) 472-2231 / FAX (402) 472-2837

If you have any additional questions regarding this survey, I will be happy to talk with you. Please feel free to contact me at 402-489-2589 or dtbentz@yahoo.com.

Sincerely

David T. Bentz
Graduate Student
Ph.D. Candidate – Instructional Technology
Teacher Learning and Teacher Education Department
University of Nebraska – Lincoln

APPENDIX G

Course Syllabi

Online enrollment

SCIENCE OF FOOD

The course is designed as a Basic and Applied Science, General Liberal Education course. The course will be cross-listed with the departments of Food Science and Technology, Nutritional Science and Dietetics, and Chemistry.

I. CATALOG DESCRIPTION:

Food Science and Technology 1310 - 850

The Science of Food (3 cr)

The course is designed as an Essential Studies (ES) course emphasizing general and food microbiology, important foodborne diseases, standards that are enforced by regulatory agencies, and applied measures for the prevention of foodborne disease. Additionally, the course will describe the Hazard Analysis Critical Control Point (HACCP) system for ensuring food safety.

II. BEHAVIORAL OBJECTIVES.

1. Identify and describe the following causes of food illness:

    Food intoxication
    Food sensitivity
    Chemical intoxication
    Foodborne infection
    Foodborne intoxication
    Foodborne infestation

2. Identify the chemical, biological and physical causes of food spoilage and describe the various methods of control.

3. Identify the biological and chemical basis for foodborne illness and describe the various methods of control.

4. Identify and describe the governmental agencies and key legislation that regulate the food industry.

5. Identify and describe the various nutrition myths and eating disorders.

6. Describe the various concerns and factors associated with the sanitary management of food processing and food service facilities.

7. Describe the role nutrition has in health promotion and disease prevention.

III. NEED FOR THE COURSE

In recent years, many universities have come to the realization that programmatic concerns for training students for professions and other specialized careers have led to the development of professional degree programs that emphasize intensive, but career-specific training. University graduates in non-scientific fields have been described as scientifically illiterate with little appreciation for the impact of science and agriculture in their daily lives. We are confident that this course will provide students with general scientific concepts in biology, chemistry and physics using food as a model. It is expected that there will be considerable interest in the course since, in addition to being necessary for life, food has cultural, ethnic, geographic and religious roots.

IV. METHODS:

It will be necessary for you to view the lectures using a computer with rapid connectivity (T3, T1, DSL, Cable) since dial-up service will not be sufficient to transfer the video. If you do not have this capability at your residence, you will be able to use computers in the library and computer resource rooms.

V. CLASS SCHEDULE – Fall 2008

This course is divided into 3 Test Units.

Test 1 will be composed of material from Test Unit 1.

Test 2 will be composed of material from Test Unit 2.

Test 3 will be composed of material from Test Unit 3.

Test Unit 1 (Note-Lessons 1-10 Review Questions DUE September 28th by 4:30 p.m.)

Video lectures will be available after 4 p.m. starting on the following days:

26 Aug	Lsn 1	Ch 1	Introduction/Food Quality
28 Aug	Lsn 2	Ch 1	Food Quality
1 Sept		**Labor Day**	
2 Sept	Lsn 3	Ch 1&2	Food Quality/Controlling Rodents and Insects
4 Sept	Lsn 4	Ch 2&3	Controlling Rodents and Insects/General Chemistry
9 Sept	Lsn 5	Ch 3	Chemicals and Their Reactions
11 Sept	Lsn 6	Ch 4&5	Organic Chemistry/Proteins
16 Sept	Lsn 7	Ch 5	Proteins (con't)
18 Sept	Lsn 8	Ch 5&6	Proteins (con't)/Carbohydrates
23 Sept	Lsn 9	Ch 6&7	Carbohydrates (con't)/Lipids
25 Sept	Lsn 10	Ch 7	Lipids (con't)/Test 1 Review
28 Sept (Sunday)			**Test 1**

Test Unit 2 (Note - Lessons 11-18 Review Questions DUE Nov 2nd by 4:30 p.m.)

Video lectures will be available after 4 p.m. starting on the following days:

2 Oct	Lsn 11	Ch 8	General Micro
7 Oct	Lsn 12	Ch 8	General Micro (con't)
9 Oct	Lsn 13	Ch 9	Foodborne Intoxication

14 Oct	Lsn 14	Ch 9	Foodborne Intoxication (con't)/Foodborne Infection
16 Oct	Lsn 15	Ch 9	Foodborne Infection (con't)
20-21 Oct		**Fall Break**	
23 Oct	Lsn 16	Ch 9	Toxin Mediated Infection/Foodborne Infestation/Parasites
28 Oct	Lsn 17	Ch 10	Parasites (con't)/Food Allergies
30 Oct	Lsn 18	Ch 11	Food Intoxication & BSE/Test 2 Review
2 Nov (Sunday)		**Test 2**	

Test Unit 3 (Note – Lessons 19 - 28 Review Questions DUE December 14th by 4:30 p.m.)

Video lectures will be available after 4 p.m. starting on the following days:

6 Nov	Lsn 19	Ch 12	Biotechnology—Chemical Foodborne Intoxication
11 Nov	Lsn 20	Ch 13	Bioterrorism
13 Nov	Lsn 21	Ch 14	Food Processing
18 Nov	Lsn 22	Ch 14	Food Processing: Fermentation-Dairy-Beer
20 Nov	Lsn 23	Ch 15-17	Nutrition Intro./Dietary Guides/Nutrition from Proteins
25 Nov	Lsn 24	Ch 17-18	Nutrition from Carbohydrates
26-30 Nov		**Thanksgiving Break**	
2 Dec	Lsn 25	Ch 18-19	Nutrition from Carbohydrates (con't)/ Nutrition from Lipids
4 Dec	Lsn 26	Ch 20-22	Vitamins/Minerals/Phytochemicals
7 Dec (Sunday) 4:30 p.m.		**MAKE-UP/RETAKE EXAM**	

9 Dec	Lsn 27	Ch 23	Supermarket Nutrition
11 Dec	Lsn 28	Ch 24	Nutrition Related Health Issues/Test 3 Review
14 Dec (Sunday) 4:30 p.m.			**Test 3**

VII. ATTENDANCE

Test Dates are **9/28, 11/2, and 12/14**. If you miss either of the first two tests for reasons other than medical emergency (doctor's excuse required) or a pre-approved absence, you will be **required** to make up the test on **Sunday, December 7 at 4:30 p.m.** and you will forego the opportunity to retake one of the exams. A pre-approved absence would include an official university activity or a family emergency (a funeral--you will need to provide a funeral program).

VIII. ASSIGNMENTS

Following each unit, students will be **required** to answer several review questions. These answers will be found in your lecture notes, the background reading in the course manual and/or the PowerPoint slides. These questions must be submitted on-line via the e-Book. Completing all assignments can earn approximately 15 points for each test and you may retake them until you receive full credit.

IX. TESTS/REVIEW QUESTIONS/ASSIGNMENTS

A. Tests

There will be three tests worth 85 points each.

B. E-Book Lesson Review Questions

The remaining points for the tests will come from the Lesson Review Questions and MyPyramid Assignment.
These questions are **NOT** Bonus questions, and must be completed by the indicated dates. After the indicated dates, the questions will no longer be available and you will receive a zero for all questions not correctly answered.

Test Unit 1: Lessons 1 - 10 must be completed **by September 28th by 4:30 p.m.**

Test Unit 2: Lessons 11 - 18 must be completed **by November 2nd by 4:30 p.m.**

Test Unit 3: Lessons 19 - 28 must be completed **by December 14th by 4:30 p.m.**

C. MyPyramid Assignment

The MyPyramid Exercise worth 5 Test points will be **due no later than Noon, December 1st**. Please refer to the specific instructions available under Test Unit 3.

D. Bonus/Extra Credit Points:

There are opportunities to earn several extra points that will not be specifically assigned. You will need to listen to the video lectures to learn what is being requested. During the semester video lectures, I occasionally ask the class to do a web search to find an answer to a specific question (e.g.: Why Buddhists don't eat garlic?), or to report on an observation (e.g.: How many people did you observe washing their hands in a public restroom?).

There will be an extra credit Letter of Insanitation worth 5 points, which has a **deadline of no later than Noon, November 5th.** Specific instructions for this extra credit are spelled out in Test Unit 2.

X. GRADING

The 3 tests, Lesson Review Questions, MyPyramid assignment and the attendance/ participation points will be added together for a total of 300 points.

Your final grade will be determined as follows:

3 Exams at 85 points (Including MyPyramid) = 255
3 Sets of assignments at 15 points = 45 points
Total points = 300

TOTAL POINTS		
291 - 300	A+	97-100%
270 - 290	A	90-96%
261 - 269	B+	87-89%
240 - 260	B	80-86%
231 - 239	C+	77-79%
210 - 230	C	70-76%
201 - 209	D+	67-69%
180 - 200	D	60-66%

179 & Below F ≤59%

XI. MAKE-UPS/RETAKES

If you are not required to take a make-up test on December 7, you will have the opportunity to retake one of the first two tests. Although you will receive the higher of the two scores, the make-up exam will be of a comparable rigor and it is unlikely you will improve your score without adequate study.

XII. TEXTBOOK is an e-Book

All students are required to purchase the course manual. Compared to the costs books required for your other classes, I believe you will find it inexpensive at $35.00. The e-Book will follow the lectures and will provide a thorough narrative of the lectures. All course resources are available on the e-Book website and all lesson assignments will be completed on-line at the site.

XIII. INSTRUCTOR

Although the course will have several lecturers, I am the lead instructor and I can be reached as follows:

John Rupnow
Department of Food Science and Technology
353 Food Industry Complex
University of Nebraska-Lincoln
Lincoln, NE 68583-0919
Cell Phone: 402-540-9361
Email: SciFD1@unl.edu

The administrative assistant for the class is Linda Hill who can be reached at
402-472-5791 or in room 358 Food Industry Complex.

If you are having difficulty with any of the concepts in the lectures, please feel free to contact me to arrange an appointment for a help session.

XIV. E-Mails

When sending e-mails please use the link on e-Book or do the following:

1. Address e-mail to SciFD1@unl.edu

2. Subject Line: The Science of Food (UNL Web)

3. Signing: Include both your first and last name.

XV. Student Conduct

Academic honesty:
Academic honesty is essential to the existence and integrity of an academic institution. The responsibility for maintaining that integrity is shared by all members of the academic community. To further serve this end, the University supports a Student Code of Conduct which addresses the issue of academic dishonesty.

Diversity:
The University is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity. We assure reasonable accommodation under the Americans with Disabilities Act.

Ethics and Integrity:
The instructor is committed to offering a course that maintains an atmosphere of ethical behavior, individual integrity, and equitable treatment of each person. Expression of ideas from various perspectives acknowledges the dignity of all class members.

XVI. Technical Problems

For all e-Book technical support, please call 1-800-936-6899.

If a PowerPoint, video lecture, or the review questions are not available when they should be, please send an email to SciFD1@unl.edu or call Linda Hill at 472-5791 Monday through Friday 8:00 a.m. to 5:00 p.m.

For problems with Blackboard contact Terry Workman tworkman2@unl.edu phone (402) 472-0977

Face-to-face enrollment

SCIENCE OF FOOD

The course is designed as a Basic and Applied Science, General Liberal Education course. The course will be cross-listed with the departments of Food Science and Technology, Nutritional Science and Dietetics, and Chemistry.

I. CATALOG DESCRIPTION:

Food Science and Technology 131, Nutritional Science 131, Chemistry 131

The Science of Food (3 cr)

The course is designed as an Essential Studies (ES) course emphasizing general and food microbiology, important foodborne diseases, standards that are enforced by regulatory agencies, and applied measures for the prevention of foodborne disease. Additionally, the course will describe the Hazard Analysis Critical Control Point (HACCP) system for ensuring food safety.

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4. Identify and describe the governmental agencies and key legislation that regulate the food industry.

5. Identify and describe the various nutrition myths and eating disorders.

6. Describe the various concerns and factors associated with the sanitary management of food
processing and food service facilities.

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If you miss a class, it will be necessary for you to view the lectures using a computer with rapid connectivity (T3, T1, DSL, Cable), since dial-up service will not be sufficient to transfer the video. If you do not have this capability at your residence, you will be able to use computers in the library and computer resource rooms.

V. CLASS SCHEDULE – Fall 2008

This course is divided into 3 Test Units.

Test 1 will be composed of material from Test Unit 1.

Test 2 will be composed of material from Test Unit 2.

Test 3 will be composed of material from Test Unit 3.

Test Unit 1 (Note-Lessons 1-10 Review Questions DUE Sept. 30th by 9:30 a.m.)

Videos of the lectures will be available after 4 p.m. the day of the lecture:

26 Aug	Lsn 1	Ch 1	Introduction/Food Quality
28 Aug	Lsn 2	Ch 1	Food Quality
1 Sept		**Labor Day**	
2 Sept	Lsn 3	Ch 1&2	Food Quality/Controlling Rodents and Insects
4 Sept	Lsn 4	Ch 2&3	Controlling Rodents and Insects/General Chemistry
9 Sept	Lsn 5	Ch 3	General Chemistry
11 Sept	Lsn 6	Ch 4&5	Organic Chemistry/Proteins
16 Sept	Lsn 7	Ch 5	Proteins (con't)
18 Sept	Lsn 8	Ch 5&6	Proteins (con't)/Carbohydrates
23 Sept	Lsn 9	Ch 6&7	Carbohydrates (con't)/Lipids
25 Sept	Lsn 10	Ch 7	Lipids (con't)/Test 1 Review
30 Sept (Tuesday) 9:30 a.m.			**Test 1**

Test Unit 2 (Note - Lessons 11-18 Review Questions DUE November 4th by 9:30 a.m.)

2 Oct	Lsn 11	Ch 8	General Micro
7 Oct	Lsn 12	Ch 8	General Micro (con't)
9 Oct	Lsn 13	Ch 9	Foodborne Intoxication
14 Oct	Lsn 14	Ch 9	Foodborne Intoxication (con't)/Foodborne Infection
16 Oct	Lsn 15	Ch 9	Foodborne Infection (con't)
20-21 Oct		**Fall Break**	
23 Oct	Lsn 16	Ch 9	Toxin Mediated Infection/Foodborne Infestation/Parasites
28 Oct	Lsn 17	Ch 10	Parasites (con't)/Food Allergies
30 Oct	Lsn 18	Ch 11	Food Intoxication & BSE/Test 2 Review
4 Nov (Tuesday) 9:30 a.m.		**Test 2**	

Test Unit 3 (Note – Lessons 19 - 28 Review Questions DUE December 15th by 10:00 a.m.)

6 Nov	Lsn 19	Ch 12	Biotechnology—Chemical Foodborne Intoxication
11 Nov	Lsn 20	Ch 13	Bioterrorism
13 Nov	Lsn 21	Ch 14	Food Processing
18 Nov	Lsn 22	Ch 14	Food Processing: Fermentation-Dairy-Beer
20 Nov	Lsn 23	Ch 15-17	Nutrition Intro./Dietary Guides/Nutrition from Proteins
25 Nov	Lsn 24	Ch 17-18	Nutrition from Carbohydrates
26-30 Nov		**Thanksgiving Break**	

2 Dec	Lsn 25	Ch 18-19	Nutrition from Carbohydrates (con't)/ Nutrition from Lipids
4 Dec	Lsn 26	Ch 20-22	Vitamins/Minerals/Phytochemicals
7 Dec (Sunday) 7:30 p.m.			**MAKE-UP/RETAKE EXAM**
9 Dec	Lsn 27	Ch 23	Supermarket Nutrition
11 Dec	Lsn 28	Ch 24	Nutrition Related Health Issues/Test 3 Review
15 Dec (Monday) 10:00 a.m.			**Test 3**

VII. ATTENDANCE

For each exam, you will be able to earn a total of 5 points based on your class attendance and participation. ***These points will be issued at the end of the semester.***

You are expected to attend class and you will **lose 5 points for every class missed beginning with your 3rd unexcused absence.**

Test Dates are **9/30, 11/4, and 12/15**. If you miss either of the first two tests for reasons other than medical emergency (doctor's excuse required) or an official university activity, you will be **required** to make up the test on **Sunday, December 7 at 7:30 p.m.,** and you will forego the opportunity to retake one of the exams.

VIII. ASSIGNMENTS

In each lesson, students will be **required** to answer several review questions on-line at the e-Book website. The answers will be found in your lecture notes, the background reading in the e-Book and/or the PowerPoint slides. These questions must be submitted on-line via the e-Book website. Completing all assignments can earn approximately 15 points for each test unit; and you may retake the review questions to provide you the opportunity to earn full credit.

IX. TESTS/REVIEW QUESTIONS/ASSIGNMENTS

C. Tests

There will be three tests worth 80 points each.

D. E-Book Lesson Review Questions

The remaining points for the tests will come from the Lesson Review Questions and MyPyramid Assignment.
These questions are **NOT** bonus questions and must be completed by the indicated dates. After the indicated dates, the questions will no longer be available and you will receive a zero for all questions not correctly answered.

Test Unit 1: Lessons 1 - 10 must be completed **by 9:30 a.m. September 30th**

Test Unit 2: Lessons 11 - 18 must be completed **by 9:30 a.m. November 4th**

Test Unit 3: Lessons 19 - 28 must be completed **by 10:00 a.m. December 15th**

E. MyPyramid Assignment

The MyPyramid exercise, which must be submitted on-line, is worth 3 Test points and will be **due no later than Noon, December 1st.** Please refer to the specific instructions available under Test Unit 3.

F. Bonus/Extra Credit Points:

There are opportunities to earn several extra points that will not be specifically assigned. You will need to listen to the lectures to learn what is being requested. During the semester lectures, I occasionally ask the class to do a web search to find an answer to a specific question (e.g.: Why Buddhists don't eat garlic?), or to report on an observation (e.g.: How many people did you observe washing their hands in a public restroom?).

There will be an extra credit Letter of Insanitation worth 5 points, which has a **deadline of no later than Noon, November 5th.** Specific instructions for this extra credit are spelled out in Test Unit 2.

X. GRADING

The 3 tests, Lesson Review Questions, MyPyramid assignment, and the attendance/ participation points will be added together for a total of 300 points.

Your final grade will be determined as follows:

3 Exams at 80 points (Including MyPyramid) = 240
3 Sets of assignments at 15 points = 45 points
Attendance/participation = 15 points
Total points = 300

TOTAL POINTS

291 - 300	A+	97-100%
270 – 290	A	90-96%
261 - 269	B+	87-89%
240 - 260	B	80-86%
231 - 239	C+	77-79%
210 - 230	C	70-76%
201 - 209	D+	67-69%
180 - 200	D	60-66%
179 & Below	F	≤59%

XI. MAKE-UPS/RETAKES

If you are not required to take a make-up test on **December 7**, you will have the opportunity to retake one of the first two tests. Although you will receive the higher of the two scores, the retake exam will be of a comparable rigor and it is unlikely you will improve your score without adequate study.

XII. TEXTBOOK is an e-book.

All students are required to purchase access to the course e-Book. Compared to the costs of books required for your other classes, I believe you will find it inexpensive at $35.00. The e-Book will follow the lectures and will provide a thorough narrative of the lectures. All lesson assignments and extra credit will be completed on the e-Book website.

XIII. INSTRUCTOR

Although the course will have several lecturers, I am the lead instructor and I can be reached as follows:

John Rupnow
Department of Food Science and Technology
353 Food Industry Complex
University of Nebraska-Lincoln
Lincoln, NE 68583-0919
Cell Phone: 402-540-9361

Email: SciFD1@unl.edu

The administrative assistant for the class is Linda Hill, who can be reached at

402-472-5791 or in room 358 Food Industry Complex (FOOD) on east campus.

If you are having difficulty with any of the concepts in the lectures, please feel free to contact me to arrange an appointment for a help session.

XIV. E-Mails

When sending e-mails, use the link on e-Book or please do the following:

1. Address e-mail to SciFD1@unl.edu

2. Subject Line: The Science of Food (UNL Live)

3. Signing: Include both your first and last name.

XV. Student Conduct

Academic honesty:
Academic honesty is essential to the existence and integrity of an academic institution. The responsibility for maintaining that integrity is shared by all members of the academic community. To further serve this end, the University supports a Student Code of Conduct which addresses the issue of academic dishonesty.

Diversity:
The University is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity. We assure reasonable accommodation under the Americans with Disabilities Act.

Ethics and Integrity:
The instructor is committed to offering a course that maintains an atmosphere of ethical behavior, individual integrity, and equitable treatment of each person. Expression of ideas from various perspectives acknowledges the dignity of all class members.

XVI. Technical Problems

For all e-Book technical support, please call 1-800-936-6899.

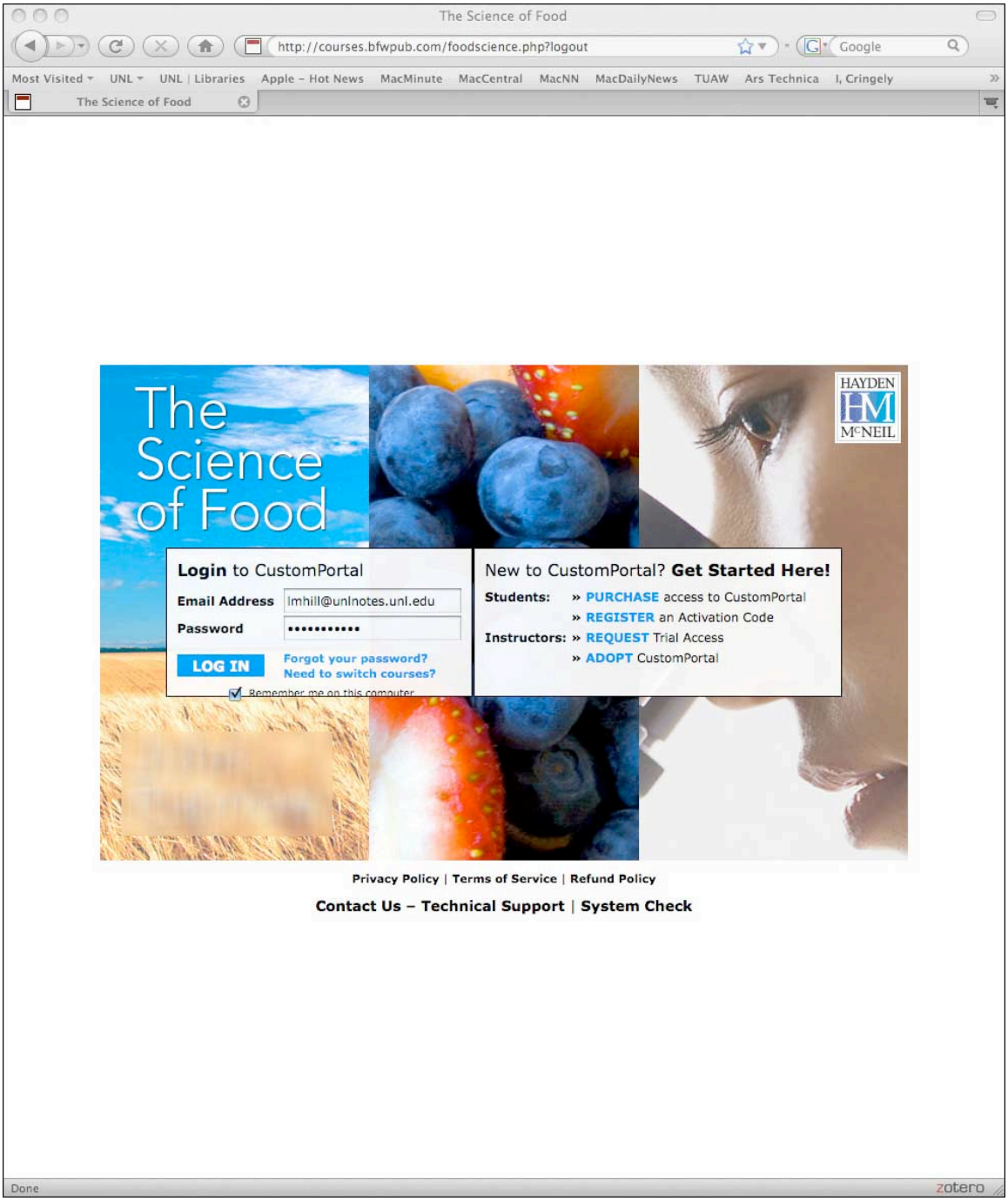
If a PowerPoint, video lecture, and the review questions are not available when they should be, please send an email to SciFD1@unl.edu or call Linda Hill at 472-5791 Monday through Friday 8:00 a.m. to 5:00 p.m.

For problems with Blackboard contact Terry Workman tworkman2@unl.edu phone (402) 472-0977

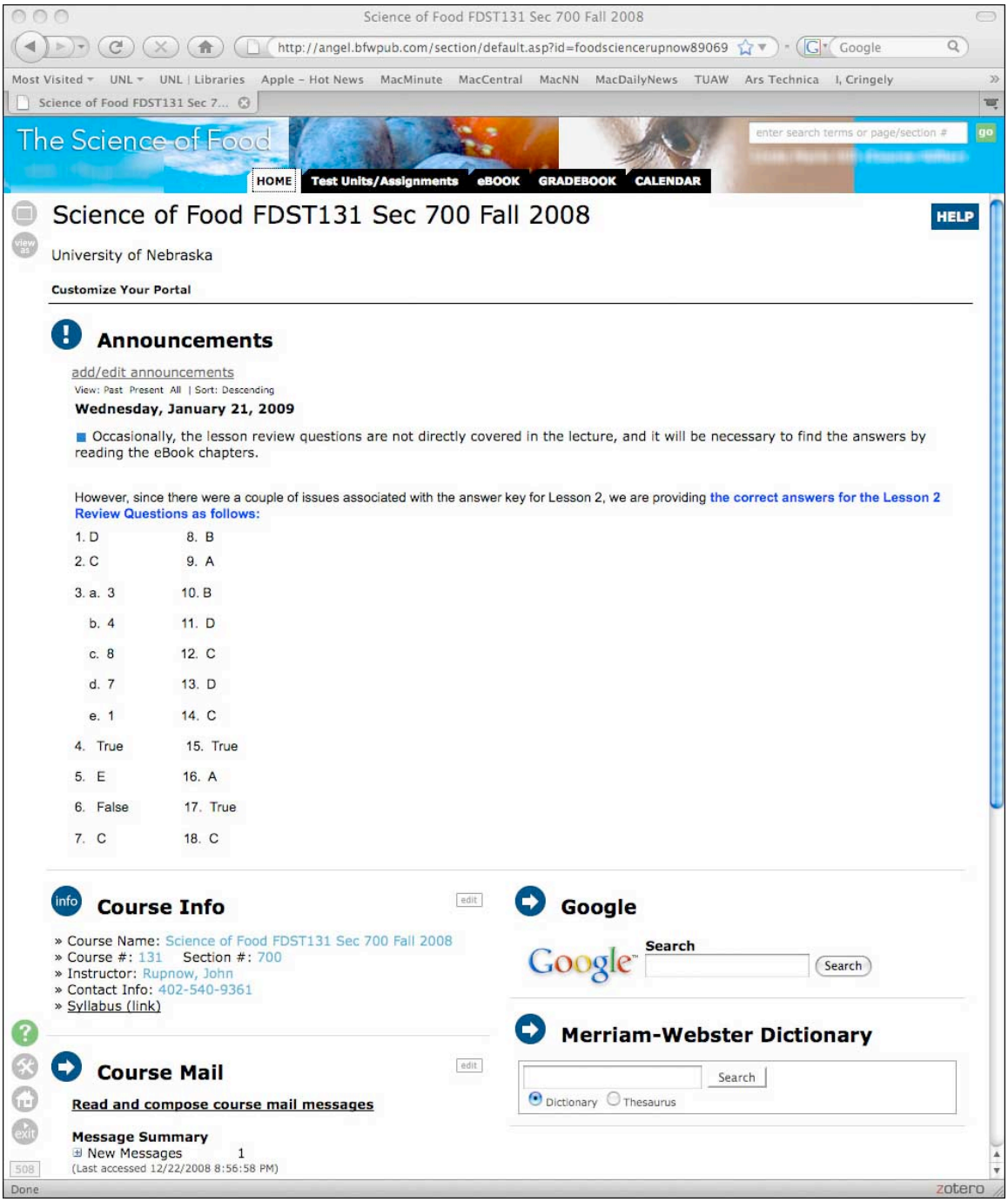
APPENDIX H

Course Management System: Coursebook (Course Content) Screen Captures

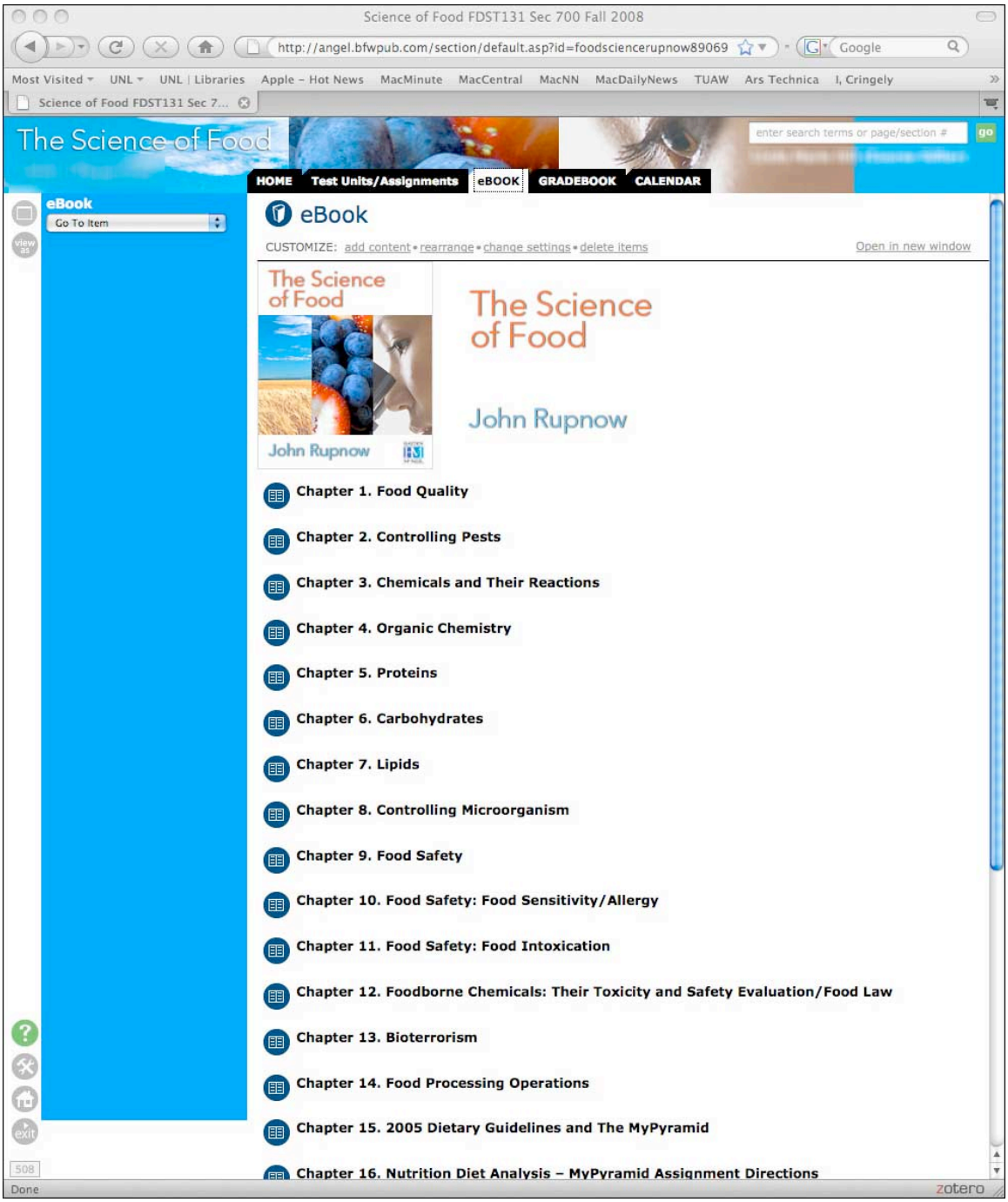
Coursebook login (available to all students)



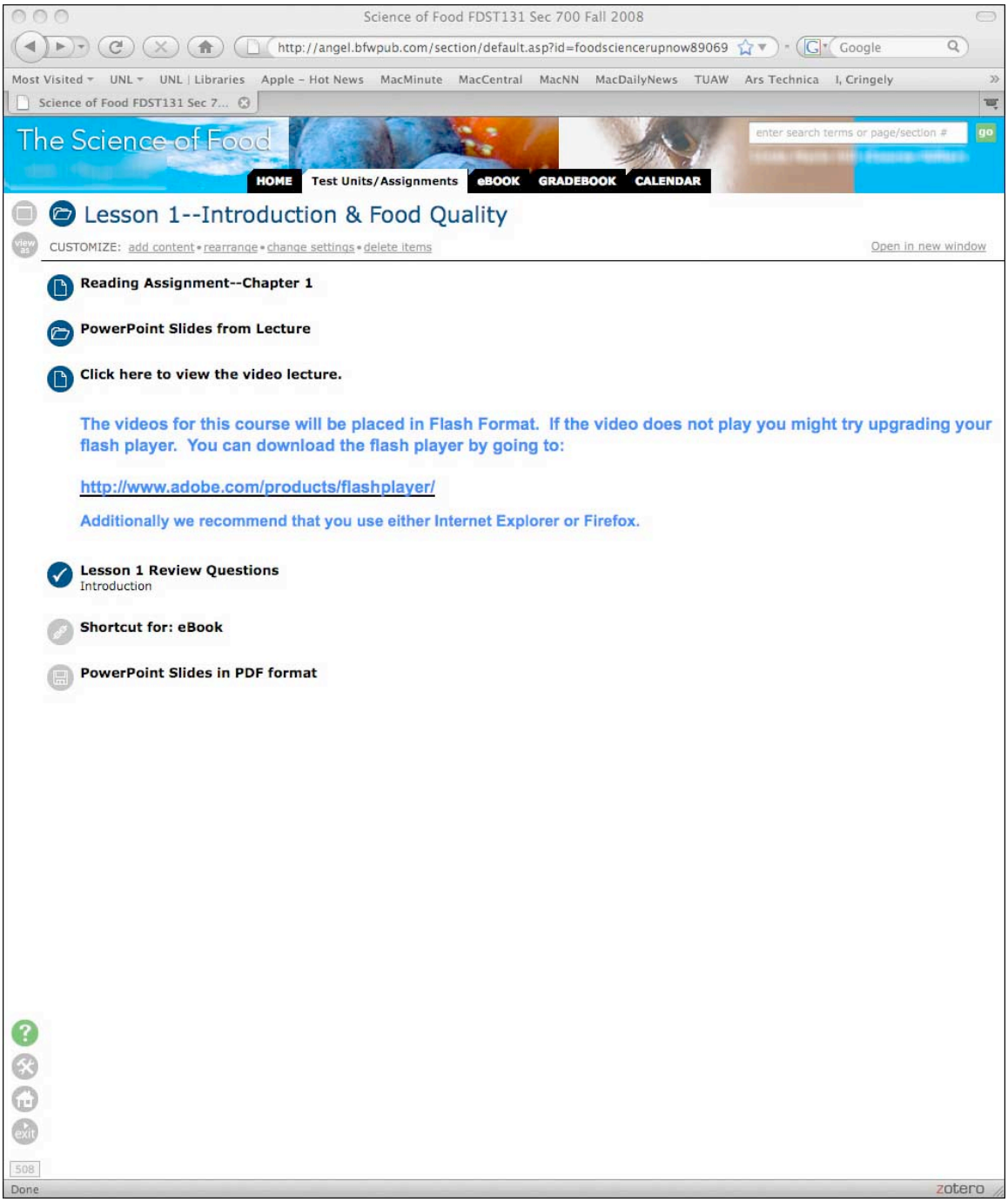
Coursebook index (available to all students)



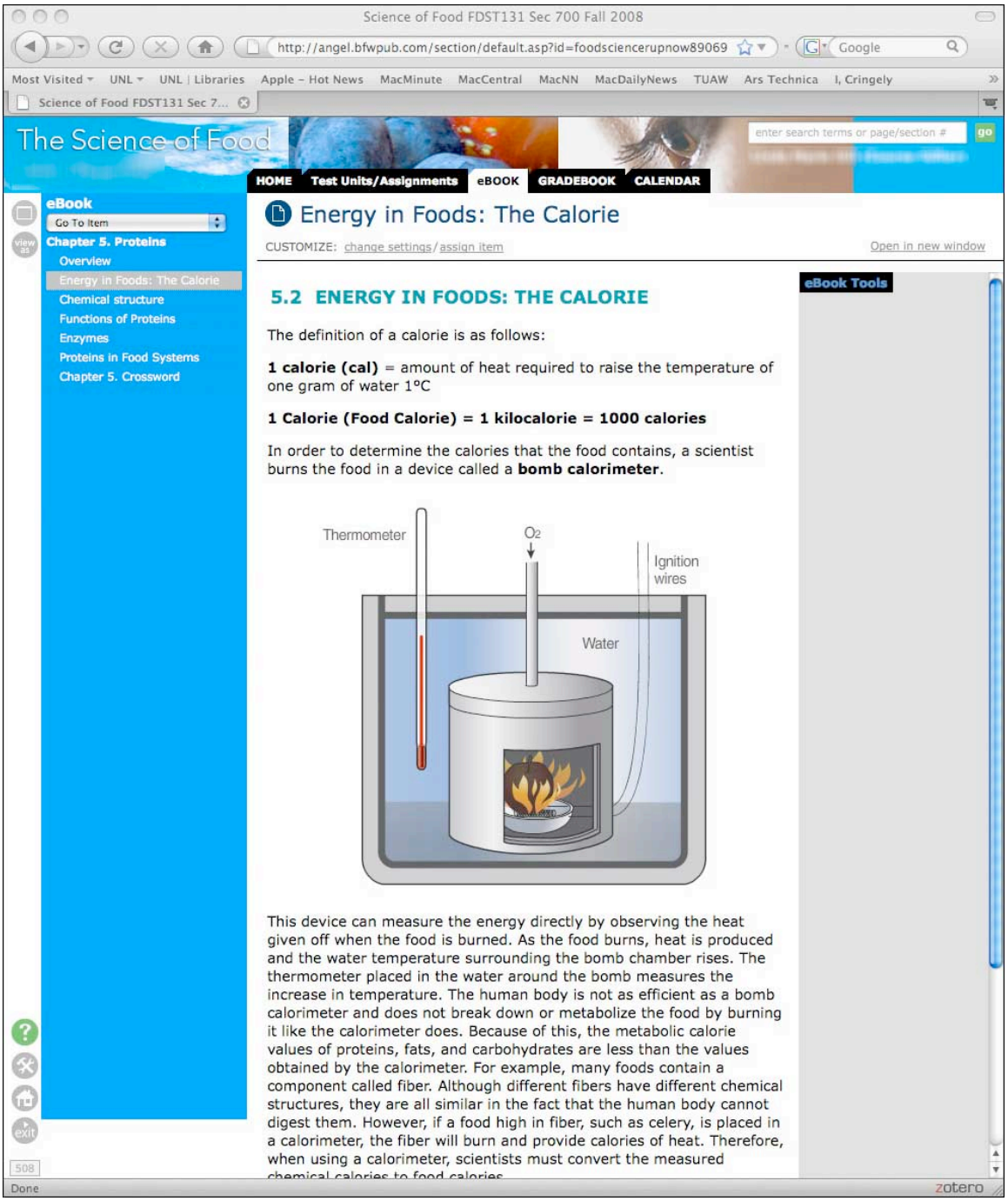
Coursebook lessons (available to all students)



Coursebook lesson items (available to all students)



Coursebook example lesson (available to all students)



Coursebook video stream (available to online students only)